



# Technical List Industrial Motors IM 01 en

**FLENDER**  
**LOHER**

Business Unit Industrial Motors

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# Basic concepts, Standards

## Quality assurance

### Quality assurance

From quotation to delivery, our complete order handling is done on the basis of an approved quality assurance system complying with the following quality standards:

DIN ISO 9001 / EN 29 001

**Loher is certified in accordance with the Directive 94/9/CE:  
PTB 99 ATEX Q 003**

## Physikalisch-Technische Bundesanstalt Braunschweig und Berlin



### (1) Production Quality Assessment Notification

(Translation)



- (2) Equipment or protective systems or components intended for use in potentially explosive atmospheres - **Directive 94/9/EC**

- (3) Notification Number: **PTB 99 ATEX Q003-1**

- (4) Product group(s): AC - motors  
in the decisive types of protection  
Increased Safety "e",  
Flameproof enclosure "d" and  
Pressurized enclosure "p"

A list of the EC-Type Examination Certificates covered by this notification is held by the notified body.

- (5) Applicant: Loher GmbH  
Hans-Loher-Straße 32, 94099 Ruhstorf, Germany

- (6) Actual manufacturer: Loher GmbH  
Hans-Loher-Straße 32, 94099 Ruhstorf, Germany

- (7) The Physikalisch-Technische Bundesanstalt (PTB), notified body No. 0102 for Annex IV in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994 notifies to the applicant that the actual manufacturer has a production quality system which complies to the Annex IV of the Directive.

- (8) This notification is based on the confidential audit report No. 02-32054, issued the July 09, 2002. This notification is valid until February 08, 2005 and can be withdrawn if the actual manufacturer no longer satisfies to the requirements of Annex IV.

**Results of periodical reassessment of the quality system production are a part of this notification.**

- (9) According to Article 10 (1) of the Directive 94/9/EC the CE-Marking shall be followed by the identification number 0102 of PTB as the notified body which is involved in the production control stage.

Zertifizierungsstelle Explosionsschutz  
By order

Braunschweig, July 11, 2002

Dr.-Ing. U. Engel  
Regierungsdirektor



Sheet 1/1

Notifications without signature and official stamp shall not be valid. The notification may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig

## CE-Marking Standards and specifications

### CE-Marking

The motors are provided with the CE-Marking acc. to the  
 – low-voltage directive 73/23 EEC changed by 93/68 EEC  
 or  
 – Directive 94/4/EC

### Standards and specifications

The motors comply with the relevant standards and specifications, especially with:

Type series	Title	DIN/EN	IEC
all types	Rotating electrical machines – Rated data and operational behaviour	DIN EN 60 034-1	IEC 60034-1 IEC 60085
	Determination of losses and of the efficiency	DIN EN 60034-2	IEC 60034-2
	IP enclosures	DIN EN 60034-5	IEC 60034-5
	Cooling systems	DIN EN 60034-6	IEC 60034-6
	Mounting arrangements	DIN EN 60034-7	IEC 60034-7
	Terminal designations and direction of rotations	DIN VDE 0530-8	IEC 60034-8
	Limit values for noises	DIN EN 60034-9	IEC 60034-9
	Acoustics: Procedure for measurement of air borne noise emitted of rotating electrical machines	DIN EN ISO 1680	–
	Installed thermal protection	–	IEC 60034-11
	Starting characteristics of motors with squirrel cage up to and including 660V, 50 Hz	DIN EN 60034-12	IEC 60034-12
	Mechanical vibrations	DIN EN 60034-14	IEC 60034-14
	IEC-standard voltages	DIN EN 60038	IEC 60038
	Three-phase motors for general use with standardized dimensions and outputs	DIN EN 50347 <sup>2</sup>	IEC 60072 <sup>1</sup>
	Output assignment for Increased Safety "e"	DIN 42677-2	–
	Centerholes with threads	DIN 332	–
	Keys, slots, high shape	DIN 6885-1	–
Motors for hazardous areas	Mounting of electrical equipment in hazardous areas	DIN EN 60079-14	IEC 60079-14
	Electrical apparatus for hazardous areas general regulations	DIN EN 50014	–
	Non-sparking "n"	DIN EN 50021	–
	Increased Safety "e"	DIN EN 50019	–
	Flameproof Enclosure "d"	DIN EN 50018	–
	Electrical apparatus for the application in areas with combustible dust	DIN EN 50281-1-1	–

<sup>1</sup> Only dimensions are determined in IEC 60072; an output assignment is not yet available.

<sup>2</sup> Delivery acc. to DIN EN 50347 from order receipt Dec. 12, 2003 with transition period for delivery until March 31, 2004

## Type code

### Type code

The complete code is indicated in the output tables.  
It consists of the following components:

Digit: 1 2 3 4 5 6 7 8 9 10 11 12

Example: **A N G A - 2 2 5 M E - 0 4 A**

Digit 1: A = totally enclosed fan-cooled Standard series  
B = totally enclosed fan-cooled Aluminium  
E = totally enclosed fan-cooled Increased Safety  
D = totally enclosed fan-cooled Flameproof Enclosure

Digit 2: N = Three-phase motor with squirrel cage, Low voltage  
M = Three-phase motor with squirrel cage, Low voltage VIK design (not for Digit 1 = D)  
B = Three-phase brake motor with squirrel cage, Low voltage  
V = Three-phase fan motor with squirrel cage, Low voltage  
J = Three-phase motor with squirrel cage, Medium voltage Up to 4.16 kV with round-wire winding  
H = Three-phase motor with squirrel cage, High voltage

Digit 3: G = Cast iron frame with fins, antifriction bearings  
S = Steel frame with fins, antifriction bearings  
C = Aluminium frame with fins, antifriction bearings  
W = Cast iron or steel frame, water-cooled, antifriction bearings

Digit 4:

	A	H	J	K	L	M	N	T	U	V	W	X	Y
		T1	T2	T3	T4	T5	T6	T1	T2	T3	T4	T5	T6
without explosion protection	II 3 G EEx nA II												
								II 2 G EEx e II					
	II 2 G EEx de IIB or II 2 G EEx d IIB							II 2 G EEx de IIC or II 2 G EEx d IIC					

Digit 5 to 7: Frame size acc. to IEC

Digit 8: Length

Digit 9: Identification letter for output and development stage (see output tables)

Digit 10 and 11:

02 = 2 poles	31 = 8/4/2 poles
04 = 4 poles	33 = 12/6/4 poles
06 = 6 poles	37 = 12/8/6 poles
08 = 8 poles	42 = 4/2 poles
10 = 10 poles	64 = 6/4 poles
12 = 12 poles	84 = 8/4 poles
27 = 16/8 poles	86 = 8/6 poles
29 = 12/6 poles	(also see output tables)

Digit 12: Loher's identification letter for mounting arrangement see page 11 and 12.

## Symbols for mounting arrangements

### Installation of rotating electrical machines to DIN EN 60034-7













The most commonly used mounting arrangements are shown in the table. Mounting arrangements possible for the various frame sizes are indicated in the dimension drawings. Other mounting arrangements are available on request. The mounting arrangement according to the corresponding order is stated on the rating plate in compliance with Code I, DIN EN 60034-7. It also appears as identification letter in the type code. An exception is a motor design the mounting of which is

not standardized according to Code I. In these cases the mounting is stated according to Code II. Standard motors, i.e. frame sizes 90–315M ordered in the basic mounting arrangements (universal mounting arrangements) IM B3, IM B5 or IM B14 can also be operated in the following mounting positions:

**IM B3** in IM B6, IM B7, IM B8, IM V5 or IM V6,  
**IM B5** in IM V1 or IM V3,  
**IM B14** in IM V18 or IM V19.  
This is applicable without any

restriction for motors up to frame size 180 (standard design without drain holes for condensed water). From frame size 200 it has to be taken care for mounting that the drain holes are situated at the deepest place. Mains connection of the motors is assured by the 90° rotability of the terminal boxes for all mounting arrangements. Motors designs “without explosion protection for vertical arrangement with shaft end downwards” are supplied without protective hood on the fan cover, unless otherwise explicitly specified.

### Horizontal mounting, with end shields












Mounting arrangement			Explanation				
Drawing	Symbol to DIN EN 60034-7		Bearings	Stator (Frame)	General design	Fixing or mounting	Identification letter for motors
	Code I	Code II					
	IM B3	IM 1001	2 end shields	with feet	—	mounting on substructure	A
	IM B35	IM 2001	2 end shields	with feet	flange fixing	mounting on substructure with additional flange	D
	IM B34	IM 2101	2 end shields	with feet	flange fixing	mounting on substructure with additional flange	F
	IM B5	IM 3001	2 end shields	no feet	flange fixing	flange mounting	C
	IM B6	IM 1051	2 end shields	with feet	arrgt. IM B3, if necessary end shields rotated 90°	wall mounting feet on left seen from driving end	B
	IM B7	IM 1061	2 end shields	with feet	arrgt. IM B3, if necessary end shields rotated 90°	wall mounting feet on right seen from driving end	B
	IM B8	IM 1071	2 end shields	with feet	arrgt. IM B3, if necessary end shields rotated 180°	ceiling mounting	B
	IM B9	IM 9101	1 end shield	no feet	as arrgt. IM B5 or IM B14 but without end shield a. without antifriction bearing at driving end	mounting on housing end face at the driving end	G
	IM B14	IM 3601	2 end shields	no feet	flange fixing at driving end	flange mounting	E
	IM B15	IM 1201	1 end shield	with feet	arrgt. IM B3 without end shield (also without antifriction bearing) at driving end	mounting on substructure and on housing end face at driving end	J
	IM B20	IM 1101	2 end shields	with feet approx. at shaft height	—	sunk into substructure	L
	—	IM 5210	no bearing	no feet	no shaft, rotor located on separate shaft	stator mounting to coupled machine	Y



## Symbols for mounting arrangements

### Flange designations

#### Vertical mounting, with end shields

Mounting arrangement			Explanation				
Drawing	Symbol to DIN EN 60 034-7		Bearings	Stator (Frame)	General design	Fixing or mounting	Identification letter for motors
	Code I	Code II					
	IM V1	IM 3011	2 end shields	no feet	flange fixing at driving end	flange mounting substructure	M
	IM V15	IM 2011	2 end shields	with feet	flange fixing at driving end	wall mounting and additional flange below	T
	IM V2	IM 3231	2 end shields	no feet	flange fixing at non-driving end	flange mounting below	N
	IM V3	IM 3031	2 end shields	no feet	flange fixing at driving end	flange mounting above	P
	IM V36	IM 2031	2 end shields	with feet	flange fixing at driving end	wall mounting or on substructure with additional flange above	U
	IM V5	IM 1011	2 end shields	with feet	—	wall mounting or on substructure	R
	IM V6	IM 1031	2 end shields	with feet	—	wall mounting or on substructure	R
	IM V8	IM 9111	1 end shield	no feet	arrgt. IM V1 or IM V18 without end shield and without antifriction bearing at driving end	mounting on housing end face at the driving end fixing surface below	G
	IM V9	IM 9131	1 end shield	no feet	arrgt. IM V3 or IM V19 without end shield and without antifriction bearing at driving end	mounting on housing end face at the driving side fixing surface above	Z
	IM V18	IM 3611	2 end shields	no feet	flange fixing at driving end	flange mounting fixing surface below	S
	IM V19	IM 3631	2 end shields	no feet	flange fixing at driving end	flange mounting fixing surface above	S

#### Flange designations

According to EN 50347 the mounting flanges will be identified by the nominal size of the hole circle diameter.

Flanges to DIN 42948	Flanges to EN 50347	Flanges to DIN 42948	Flanges to EN 50347	Flanges to DIN 42948	Flanges to EN 50347
A120	FF100	A400	FF350	C80	FT65
A140	FF115	A450	FF400	C90	FT75
A160	FF130	A550	FF500	C105	FT85
A200	FF165	A660	FF600	C120	FT100
A250	FF215	A800	FF740	C140	FT115
A300	FF265			C160	FT130
A350	FF300			C200	FT165

# Mechanical design, general

**Enclosures**  
**Drain holes**  
**Space heater**

## Mechanical enclosure to EN 60034-5

All motors in standard design are in **Enclosure IP 55**.

Other enclosures on request.

Enclosure	Scope of Protection	
	Protection against accidental contact and the penetration of impurities	Protection against water
IP 54	Complete protection against contacting live parts and approaching such parts as well as against contacting moving parts within the enclosure. Protection against harmful dust deposits. The penetration of dust is not completely prevented, but the dust cannot enter in such as to affect a satisfactory operation of the machine.	Water splashing to the motor from all directions must not have any harmful effect.
IP 55		A jet of water from a nozzle directed to the motor from all directions has no harmful effect.
IP 56		Water by heavy seas or water in a strong jet does not enter the enclosure in harmful quantities.
IP 65 <sup>1</sup>	Complete protection against contacting live parts and approaching such parts as well as against contacting moving parts within the enclosure. Protection against penetration of dust (dust-proof).	A jet of water from a nozzle directed to the motor from all directions has no harmful effect.

<sup>1</sup> To DIN 40050/July 1980 (first identification figure [6] dust-proof, not contained in EN 60034-5).

For all mounting arrangements where the shaft end is pointing upwards, an appropriate cover to prevent small parts from falling into the fan cowl is essential, except when this protection is already provided by the driven machine. This cover, however, must not impair the cooling-air flow. Motors installed outdoors must be protected from intense solar radiation.

### Drain holes for condensed water for the type series A and E

No drain holes are provided for the motors up to frame size 180. They are only drilled on request and this is especially to be stated in the order. Motors from frame size 200 are always supplied with drain holes for condensed water. The location of these holes depends on the respective mounting arrangement. They are situated at the lowest point of the end shields. If the drain holes are not situated at the lowest point after installation and commissioning of the motor, new holes will have to be drilled and the previous holes must be plugged. At enclosures IP 55 and IP 56 the drain holes are closed. For the type series A these are sealed with an enclosure-specific plug ensuring the draining of any condensed water.

For the type series E the condensate holes are tightly sealed with a plug, the hole is to be opened regularly for draining any condensed water which has accumulated. On vertical mounting types the hole in the upper end shield is closed with a sealing plug.

### Space heater for the type series A/E/D

As protection against condensed water inside the motors, these can be equipped with a space heater, if requested by the customer. The standard supply voltages are shown in the table. Other supply voltages on request. The space heater must never be switched on during operation of the motor.

Frame size	Supply voltage V	Filament wattage per motor W
112–132	110–120 or 210–250	25
160–180	110–120 or 210–250	50
200–250	110–120 or 210–250	50
280–315	110–120 or 210–250	100
355	110–120 or 210–250	200

Alternatively it is possible to keep the stator winding warm by applying a single-phase voltage of about 5–10% of the rated motor voltage to terminals U1 and V1.

## Painting

Code		N04	N08	N14	N14A	Z21	Z05	J08	S10	S11	G04		
Use:		Standard painting-indoor installation  Standard and EEx e II motors	Outdoor climate, Tropical climate, Humid ambient  Standard painting EEx d I/II Indoor installation and outdoor climate	Tropical climate, Humid ambient  incl. J08  Increased chemical stresses, decontaminable, Ships, on-shore	VIK-Standard painting  without J08 with rotor coating	Off-shore, Drilling platforms, Customer's request  incl. J08	Customer's request (covering enamel by customer)  incl. J08	Inner painting = customer's request  (normally included in N14, Z21, Z05, S10)	Underwater coating (immersion pumps)  incl. J08	Underwater special coating (e.g. immersion pumps) = customer's request with covering enamel, decontaminable	Customer's request (covering enamel by customer)		
<div><div>200 150 100 50 0 µm</div><div>Finishing coat</div></div>		<div><div><div></div><div></div><div></div><div></div><div></div></div><div>40</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div></div><div>80</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div></div><div>70</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div></div><div>70</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div></div><div>80</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div></div><div>50</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div></div><div>80</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div></div><div>75</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div></div><div>75</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div></div><div>60</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div></div><div>40</div></div>	
<div><div>30</div><div>Parts ground coat (not for aluminium a. galvanized fan cowls)</div></div>		<div><div><div></div><div></div><div></div><div></div><div></div></div><div>30</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div></div><div>30</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div></div><div>30</div></div>				<div><div><div></div><div></div><div></div><div></div><div></div></div><div>30</div></div>			<div><div><div></div><div></div><div></div><div></div><div></div></div><div>30</div></div>		
Layer thickness > µm finishing coat		40	80	140	210	50	80	210	230	40			
Resistance list	Climate groups EN 60721-3	moderate	worldwide										
	Cond. climate KFW DIN 50017	+	+	++		++	+			++	+		
	Sulphur dioxide DIN EN ISO 6988	0	+	+/++		++	+				0		
	Salt water DIN 53167	0	+	+/++		++	+		+/++	+/++	0		
	Ammonia ~10%	+	++	++		++	+		++	++	+		
	Mineral oils Greases Solvent Benzine/benzol Alcohol	+	++	++		++	++		++	++	+		
	Sulphuric acid 10% 50%	0 —	+ 0	++ +		++ +	+ 0				0 —		
	Soda lye 10% 40%	0 —	+ 0	++ ++		++ ++	+ +				— —		
	Hydrochloric acid 37%	0	0	+		+	—				—		
	Temperature range (...) = short-time		-40 to +130°C (-60 to +150°C, at +180°C possibly slight discolouring)										
Air humidity		90%		100%			90%		100%	100%	90%		
Re-painting		good within 1 week, then, polishing is necessary					very good				very good		
Other		Abrasion-proof, elastic, scratch-resistant, impact resistant, fully light-resistant, physiologically without harm.											
Adhesion DIN EN ISO 2409		Identification Gt1											
Pre-treatment of the parts		All parts cleaned and degreased, steel and grey-cast iron parts sand blasted.											
Drying		All layers dried forcibly.											
Colour		Standard RAL 7030 (stone-grey)					grey <sup>1</sup>	RAL 7032 (pebble grey)	grey <sup>1</sup>	RAL 7030 (stone grey)	RAL 7032 (pebble grey)		
Colours <sup>2</sup> available acc. to RAL		1004, 1018, 2004, 5009, 5010, 5012, 5015, 5018, 6002, 6003, 6011, 7000, 7011, 7031, 7032, 7036, 7038, 9010, other colours on request					—		—	like paintings N04-Z21			
Bright parts shaft end/flanges		Provided with corrosion-protective special oil repelling water and hand-sweat.											
Explanation:		<div><div></div> = EP-zinc-ground coat</div> <div><div></div> = KH-grounding (partly EP-ground coat)</div> <div><div></div> = EP-ground coat resp.-intermediate coating</div>				<div><div></div> = EP-micaeous iron-interm. coating</div> <div><div></div> = PUR-covering enamel</div>				<div><div>++</div> = stable for a long time</div> <div><div>+</div> = with good stability</div> <div><div>0</div> = stability limited</div> <div><div>—</div> = stable for a short-time</div> <div><div>— —</div> = non-stable</div>			

1 Colour not acc. to RAL

2 Bad-covering colours e.g. white or yellow are not made in N04 but only with a higher coating thickness (e.g. N08).

### Shaft ends

Shaft ends are cylindrical and comply with DIN EN 50347 in their design, in their assignment to frame sizes and ratings. The shaft ends of all motors from frame size 112 are equipped with a female thread for the fitting of pulleys and couplings. Keys are designed to

DIN 6885 Sheet 1 and are always supplied with the motors. On customer request a second free shaft end can be provided except for motors with attachments at the non-driving end, e.g. tachometer, EEx d brake or axially mounted forced ventilation.

Pole-changing motors with a 2-pole speed have the same shaft ends as single-speed 2-pole motors.

### Coupling drive

When aligning a motor to be coupled directly with the machine, care must be taken that the rollers and balls of the bearings do not jam. Flexible coupling is permissible with all motors. To ensure vibration-free running and to avoid an inadmissible stress on the

bearings, the machine to be coupled must be exactly aligned even in case of flexible couplings. Maximum care and accuracy must be applied to the coupling of 2-pole motors (synchronous speed  $3000 \text{ min}^{-1}$  at 50 Hz or  $3600 \text{ min}^{-1}$  at 60 Hz).

It is absolutely necessary to ensure that the half-coupling on the motor side is dynamically balanced according to the motor balance.

### Belt drive

Slide rails are used for motors from frame size 90 for easy stretching and readjusting of the belts (see accessories). The radial forces must not exceed the permissible values according to the tables "permissible loads at the shaft end".

### Fitting and removal of pulleys and couplings

Pulleys and couplings must only be fitted and removed by means of special devices.

### Running smoothness, balance

For all motors the rotors are dynamically balanced at operating speed with the half key fitted acc. to DIN ISO 8821. "Full key" or "without key" balancing is only made on special order. The balance is indicated on the shaft end or on the rating plate (H = half key, F = full key, N = without key). The transmission parts (couplings,

pulleys) have also to be dynamically balanced at operating speed in accordance with the motor balance. Rotors are designed for a centrifugal speed corresponding to a 1.2 times rated speed. A maximum of running smoothness free from vibrations is obtained by the careful selection of

antifriction bearings and precise keeping of fits. Standard motors comply with vibration level N to DIN VDE 60034-14. On customer request a low-vibration level R (reduced) can be supplied. Vibration level S (special) is available on request, if necessary with reduced output only.

### Noise data

The measuring surface sound pressure  $L_{pFA}$  as well as the sound power level  $L_{WA}$  of single-speed motors is shown in the table. The noise data stated in this table are valid for motors with fixed voltage and a rated power at 50 Hz. Noise

data increased by about 3 dB(A) will be obtained for motors with a voltage range. The tolerance is +3 dB (A). Noise levels in case of 60 Hz, for motors with 10 and more poles, for motors with modified output and for pole-

changing motors as well as for inverter operation on request. The noise measurements are made according to DIN EN ISO 1680 in the noise test room.

## Measuring surface sound pressure level Cooling air volume

## Measuring surface sound pressure level and sound power level for the Types A.../ E.../ D... at rated power

Frame size	Measuring surface sound pressure level Sound power level Motors in standard design – noise grade 1								Noise-reduced motors <sup>1</sup> Unidirectional fan Noise grade 3	
	2pole 3000 min <sup>-1</sup>		4pole 1500 min <sup>-1</sup>		6pole 1000 min <sup>-1</sup>		8pole 750 min <sup>-1</sup>		2pole 3000 min <sup>-1</sup>	
	L <sub>ptA</sub> dB	L <sub>WA</sub> dB	L <sub>ptA</sub> dB	L <sub>WA</sub> dB	L <sub>ptA</sub> dB	L <sub>WA</sub> dB	L <sub>ptA</sub> dB	L <sub>WA</sub> dB	L <sub>ptA</sub> dB	L <sub>WA</sub> dB
071	52	63	46	57	45	56	42	53	–	–
080	56	67	47	58	45	56	43	54	–	–
090	60	72	49	60	47	58	46	57	–	–
100	64	76	54	66	50	62	49	61	–	–
112	64	76	54	66	54	66	53	65	55	66
132	63	75	59	71	60	72	55	67	57	69
160	68	80	64	76	63	75	61	73	61	73
180	70	83	63	76	62	75	63	76	62	75
200	73	86	63	76	60	73	64	77	63	76
225	73	86	64	77	62	75	60	73	64	77
250	76	90	66	80	64	78	61	75	66	80
280	77	91	68	82	66	80	65	79	68	82
315	80	94	70	84	70	84	69	83	70	84
355	81	96	73	88	74	89	72	87	77	92

<sup>1</sup> Motor length (dimension L or LC) increases for Noise grade 3  
Dimension drawing on request.

## Cooling air volume and permissible counterpressure

Frame size	3000 min <sup>-1</sup>		1500 min <sup>-1</sup>		1000 min <sup>-1</sup>		750 min <sup>-1</sup>	
	Cooling air volume	Permissible counter- pressure Pa	Cooling air volume	Permissible counter- pressure Pa	Cooling air volume	Permissible counter- pressure Pa	Cooling air volume	Permissible counter- pressure Pa
	m <sup>3</sup> /s		m <sup>3</sup> /s		m <sup>3</sup> /s		m <sup>3</sup> /s	
071	0.03	1						
080	0.04	2	0.02	1				
090	0.06	40	0.03	10	0.02	6		
100	0.08	50	0.04	12	0.03	8		
112	0.10	50	0.05	12	0.03	8	0.02	
132	0.15	70	0.1	18	0.07	10	0.05	5
160	0.25	90	0.15	30	0.1	15	0.08	8
180	0.35	100	0.2	40	0.15	20	0.1	10
200	0.4	120	0.3	50	0.2	25	0.15	12
225	0.5	120	0.45	50	0.3	30	0.23	15
250	0.6	140	0.55	60	0.33	35	0.28	20
280	0.8	160	0.7	80	0.45	45	0.33	25
315	1.0	160	0.9	80	0.6	45	0.45	25
355 M./LB	1.5	160	1.5	80	1.0	45	0.8	25

If motors are equipped with forced ventilation, pipes for air supply or air outlet, silencers or similar parts, the values stated above are to be observed depending on the frame

size. They also have to be considered when calculating the counter-pressure of pipes.  
The values for the static counter-pressure are given in Pa

(1 Pa = 0.102 mm water column).  
They are maximum values for self-ventilation and for the air volumes stated, and not to be exceeded in pipes, silencers or similar parts.

## Cooling air inlet Resistance to shocks

### Cooling air inlet for A... /E... /D...

Minimum distance between fan cover and a wall located behind it or the air flow influencing add-on parts, e.g. pulleys without spokes.

Frame size	Distance [mm]
071	15
080	20
090	20
100	25
112	30
132	30
160	35

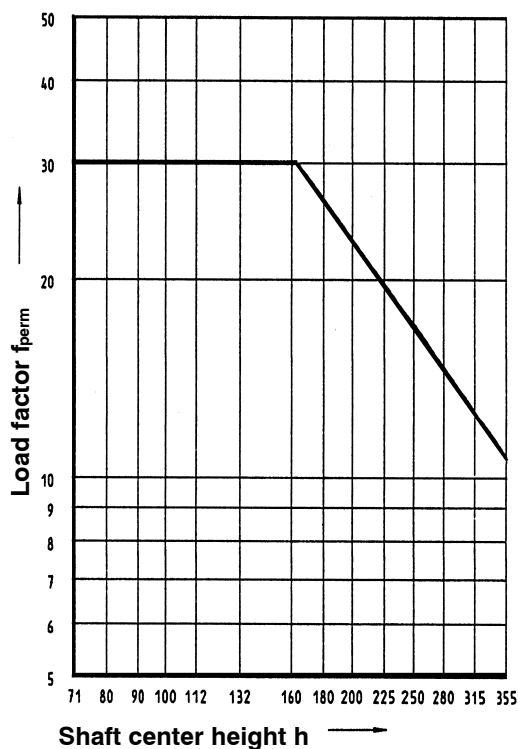
Frame size	Distance [mm]
180	45
200	60
225	65
250	65
280	70
315	70
355	80

### Resistance to shocks

If shock stresses are to be expected, e.g. from an earthquake, storm, explosion or on ships, the maximum permissible values for the motors in this technical list are shown in the diagram below.

The values  $f_{\text{permissible}}$  are multiples of the acceleration due to gravity ( $g \approx 9.81 \text{ m/s}^2$ ) related to the motor frame size  $h$  (shaft center height). The graph is valid with a safety factor of 1.0 for all mounting arrangements and shock effects. In the event of higher stresses, please contact us. Depending on the speed of the shock acceleration, special provisions will be necessary. For determination of the shock acceleration, in most cases the weight of the assembled unit, e.g. motor with driven machine, baseframe and coupling, is to be taken as a basis.

The values for shock load are not applicable to regularly occurring operation-dependent vibrations or shock pulses. In these cases please contact us.



## Packing dimensions and weights

### Dimensions and tolerances

#### Dimensions and tolerances

Frame size	Overseas shipment (seaworthy packing)		Overland transport	
	Type	Tare approx. kg	Dimensions mm	Tare approx. kg
71	Carton	1	Carton	1
80	Carton	1	Carton	1
90	Carton	2	Carton	2
100	Carton	3	Carton	3
112	Carton	4	Carton	4
132	Carton	6	Carton	6
160	Cross crate	8	Cardboard box L x W x H 800 x 590 x 600	25
180	Cross crate	10	800 x 590 x 600	25
200	Planks	5	980 x 680 x 800	35
225	Planks	6	980 x 680 x 800	35
250	Planks	7	1300 x 970 x 900	50
280	Planks	8	1300 x 970 x 900	50
315	Planks	9	1300 x 970 x 900	50
355	Planks	12	Crate dimensions on request	Weights on request

For motor weights see output tables.

#### Mounting IM B3, standard design, single packing

#### Tolerances for motor mounting dimensions

The following tolerances are valid for motor mounting dimensions H, K, for foot motors and S for flange motors indicated in the dimension drawings.

Shaft ends are made to DIN EN 50347, keyways and keys to DIN 6885 sheet 1.

Dimension Tolerances to DIN EN 50347:

H	above	50 up to 250 mm	−0.5 mm
	over	250 up to 630 mm	−1 mm

K and S	H17
---------	-----

E	23 up to 170	−0.2 mm
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# Electrical design, general

## Stator winding Duty types

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### Stator winding

High-quality enamelled wires, suitable surface insulating materials and the type of impregnation (current-UV or vacuum technology) form insulation systems for the motor windings which guarantee a high level of mechanical and electrical stability combined with a high utilization factor and a long service life. The insulation system is suitable for a rated voltage up to 1000V. These insulation systems provide the windings with ample protection against the influence of aggressive gases, vapours, dust

and oil. They resist stresses imposed by normal climates in accordance with EN 60721-3 and are tropic-proof. For a moist, changeable climate, which is also present in several tropical regions, the special design with increased protection against humidity is necessary. The silicon caoutchouc sealing is recommended independently of the individual insulation class in those cases where due to the drive or service conditions of the motor there is a danger of increased condensed water formation or

where highly conductive dust deposits on the heads of the windings are to be avoided. The application of the sealing offers special advantages in combination with insulation classes F and H in those cases where motors are to be used with high switching frequency or for especially severe starting and braking conditions. In addition, the sealing process provides the windings with increased mechanical short-circuit resistance.

### Duty types

The output ratings stated in the tables apply to duty type S 1 (continuous running at constant load) according to EN 60034-1. For the duty types S 4, S 5, S 7 and S 8 it is also necessary to mark the moments of inertia for the motor ( $J_M$ ) and the driven machine ( $J_{ext}$ ) in addition to the data for the cyclic duration factor and the switching frequency.

All moments of inertia must refer to the motor speed. In accordance with EN 60034-1 the following duty types are distinguished:

1. Duty types where starting or electrical braking **do not influence the temperature rise of the stator winding** of the motor:

Duty type S 2: Short-time duty  
Operating times of 10, 30, 60 and 90 minutes are recommended. After each operating period the motor remains dead until the winding has cooled down to the coolant temperature.

Duty type S 3: Intermittent periodic duty where starting does not influence the temperature.

Duty cycle 10 minutes unless otherwise agreed upon. For the relative time the motor is switched on (cyclic duration factor CDF), the values 15, 25, 40 and 60% are recommended.

Duty type S 6: Continuous operation with intermittent load. Duty cycle 10 minutes unless otherwise agreed upon. For the cyclic duration factor the values 15, 25, 40 and 60% are recommended.

2. Duty types where starting or electrical braking **influence the temperature rise of the stator winding** and of the rotor cage:

Duty type S 4: Intermittent periodic duty where starting influences the temperature.

Duty type S 5: Intermittent periodic duty where starting and braking influence the temperature.  
For the duty type S 4, c/h means starting operations, for duty type S 5, c/h means starting and braking operations.

Duty type S 7: Continuous operation duty with starting and braking.

Duty type S 8: Continuous operation duty with pole changes. For these two duty types the load during the operating period has also to be stated.

Duty type S 9: Continuous operation duty with non-periodical load and speed variation (inverter operation).

Duty type S 10: Operation with single constant loads.

Most of the real duty type conditions represent a combination of duty types as mentioned under 1. and 2. In order to determine a suitable motor exactly, details of all the operating conditions are required. The necessary information is compiled in our questionnaires (see section "Order Checklist").



### Type of rotor and torque

The motor rotors have a squirrel-cage design and are suitable for direct-on starting. The rotor cages for smaller motors are aluminium die cast, for larger motors they are brazed. The starting torque behaviour is marked in the output tables by the rotor class indicated for every type. These are the rotor classes HS 2, HS 3, HS 4 and HS 5 as well as DS 4 and DS 5. The diagrams show the speed-torque curves for the above mentioned rotor classes. The maximum permissible mean load torque of the driven machinery is indicated in the diagrams by a horizontal dotted line. In the tables, the values of

starting torque and starting current are stated for all motors as multiples of the rated torque and the rated current.

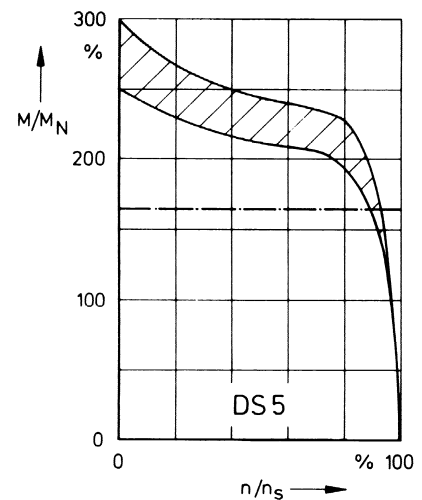
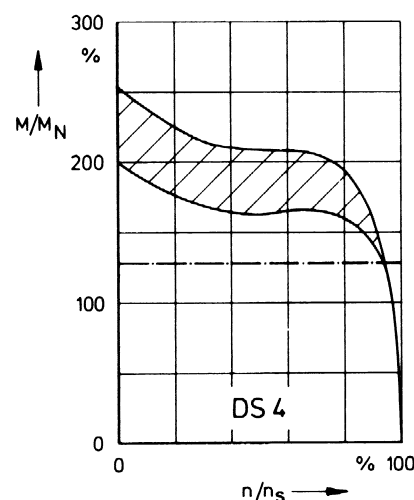
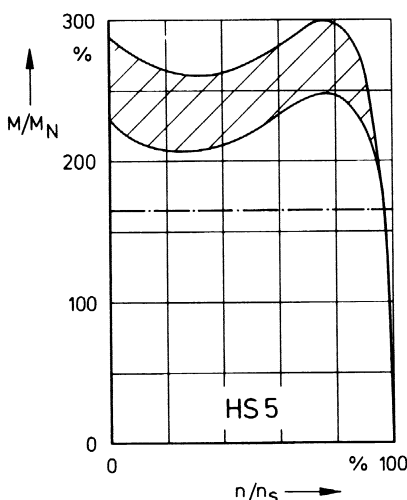
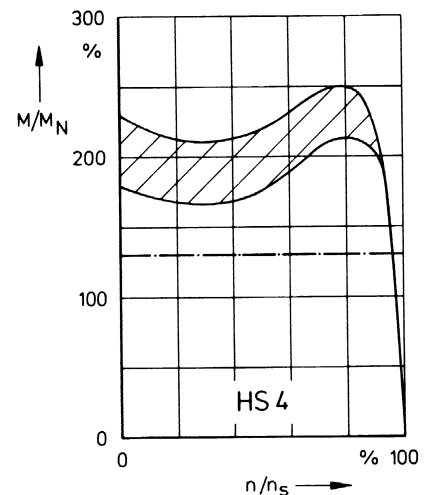
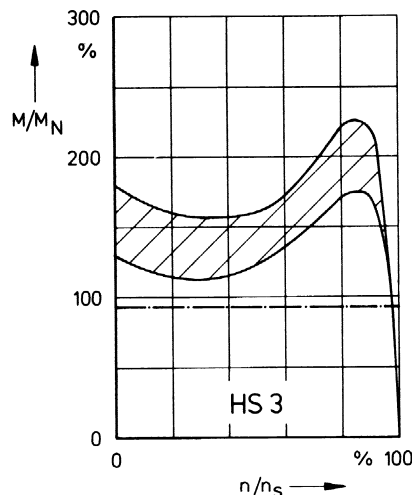
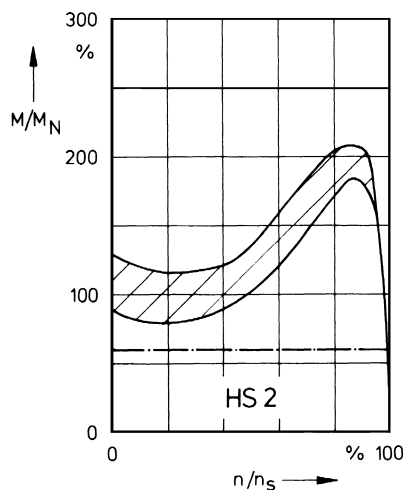
For driving heavy flywheel masses, for frequent starting and stopping service, for motors intended to drive lifts and cranes, special rotors of classes W, SHS 1, SHS 2 as well as SDS 3 and SDS 4 are used. The particular choice of the most suitable rotor type and the corresponding output for a certain number of poles and frame size depend on the actual operating conditions. These must be known when using special rotors, in particular the moment of inertia (J) of the

driven machinery and the load-torque starting characteristics.

The diagrams only show the characteristics of the torque related to the speed. Please contact us for drives the load-torque characteristics of which come very close to the range of the motor torque characteristics.

The given range shows an approximation of the torque characteristics which are possible within the corresponding rotor classes.

The valid tolerances according to EN 60034, however, refer to the values stated in the output tables.



### Voltages and frequencies general

The motors in this technical list are supplied for a standard voltage according to the table on the right for 50 Hz systems. On customer request they can also be supplied for a fixed voltage (e.g. 400V) or for a wide voltage range (e.g. 380–420V). The table on the right shows the commonly applied rated voltages and the appropriate tolerances. The motors can be supplied with non-standard winding for almost every frequency and for almost any voltage up to 1000V. The operation data acc. to the output tables are applicable for respective rated voltages as indicated and with the tolerances in accordance with DIN EN 60034-1.

For the various type series

– standard, (not EExe)

– EEx e

– EEx n

– EEx d

different limit values and design specifications are applicable.

These are indicated in the electrical data assigned to the respective types.

### Rated current

In some output tables the rated currents are only indicated for a rated voltage of 400V. For other voltages the rated currents are inversely proportional to the voltages:

$$\frac{U}{U'} = \frac{I'}{I}$$

### Tolerances

According to EN 60034-1 the electrical data stated in the output tables are subject to the following tolerances:

Efficiency:

≤ 50 kW: – 0.15 (1 – η)

> 50 kW: – 0.1 (1 – η)

### Standard voltages and tolerances

Fixed voltage	Tolerance range A ± 5%	Tolerance range B ± 10%	Wide voltage range	Tolerance range A ± 5%	Tolerance range B ± 10%
Rated voltage	Voltage limit	Voltage limit	Rated voltage range	Voltage limit	Voltage limit
230V	218V–242V	207V–253V	218V–242V	207V–254V	196V–266V
400V	380V–420V	360V–440V	380V–420V	361V–441V	342V–462V
500V	475V–525V	450V–550V	475V–525V	451V–551V	427V–578V
690V	655V–725V	621V–759V	655V–725V	622V–761V	589V–798V

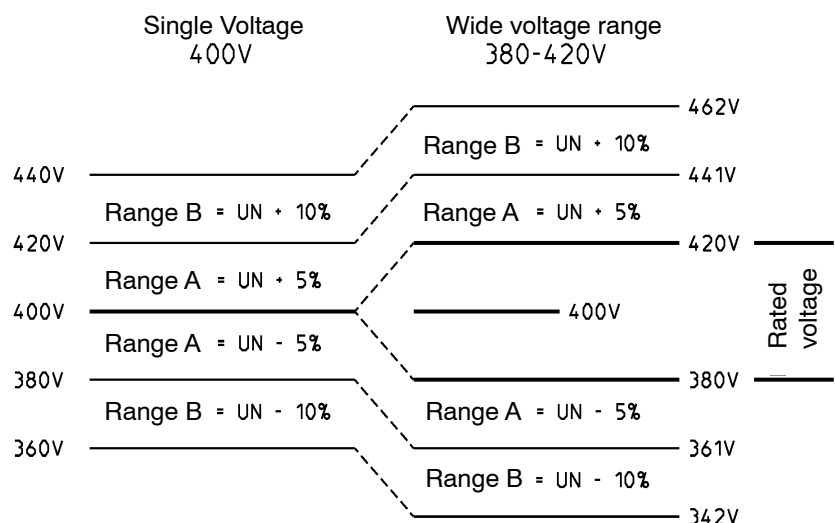
#### Tolerance range A:

In continuous duty the motor must be reliable. The temperature rise is allowed to be higher by 10 K than the limit value.

#### Tolerance range B:

The motor must be reliable and the characteristics are not allowed to deviate strongly; an operation over a longer period at the limits of B is not recommended; not permissible for EEx e.

#### Example:



This results in:

$$I' = \frac{U \cdot I}{U'}$$

Example:

According to the output table the pole-changing motor ANGA-180 MB-42 has a rated current of 31/37 A at 400V. At 230V the rated current will be:

$$I' = \frac{400 \cdot 31 \text{ or } 37}{230} = 54/64 \text{ A}$$

$$\text{Power factor: } - \frac{1 - \cos \varphi}{6}$$

(min. 0.02, max. 0.07)

Starting torque: –15% and +25%

Breakdown torque: –10%

Starting current: +20% without a lower limit

Slip at rated load and operating temperature:

≥ 1kW ±20% of the guaranteed slip

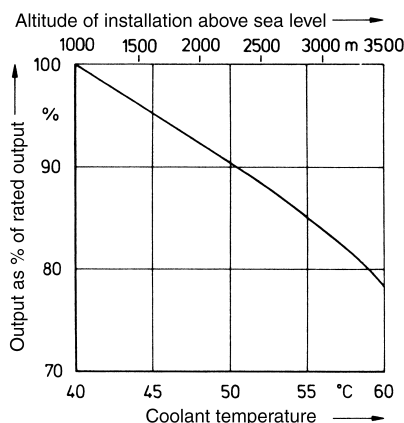
< 1kW ±30% of the guaranteed slip

**Output**  
**Overload capacity**  
**Efficiency and**  
**Power factor**  
**Conversion of power**

**Output**

The rated outputs and operating characteristics given in the tables refer to the continuous duty S 1 according to EN 60034-1 at a rated frequency of 50 Hz, rated voltage, a coolant temperature of max. 40°C and an altitude of installation up to 1000m above sea level. Motors can also be operated at a coolant temperature exceeding 40°C up to max. 60°C or at an altitude exceeding 1000m up to max. 4000m above sea level. In these cases the rated output given in the tables must be reduced in accordance with the diagram or a larger motor or a higher insulation class is to be chosen. However, it is not necessary to change the rated data if in case of altitudes exceeding 1000m above sea level the coolant temperature is reduced according to the table 2:

Altitude of installation m	max. coolant temperature for insulation class	
	B	F
0 to 1000	40	40
above 1000 to 2000	32	30
above 2000 to 3000	24	19
above 3000 to 4000	16	9



**Conversion of power**

For conversion of the power from kW into HP is applicable **1 kW = 1.341 HP**

**Occasional overload capacity**

According to EN 60034-1 motors with a rated output up to 315 kW which have reached their operating temperature can be loaded with 1.5 of their rated current for 2 minutes without impairment of their service life. No definitions were made for larger motors.

**up to frame size 180**

Efficiency in % at			
1/2	3/4	4/4	5/4
of full load			
89	91	<b>91</b>	90.5
88	90	<b>90</b>	88.5
87	89	<b>89</b>	87.5
86	88	<b>88</b>	86.5
85	87	<b>87</b>	84.5
85	86	<b>86</b>	84.5
84	86	<b>85</b>	83.5
83	85	<b>84</b>	82.5
82	84	<b>83</b>	81.5
80	82.5	<b>82</b>	80.5
79	81.5	<b>81</b>	79.5
78	80.5	<b>80</b>	78.5
77	79.5	<b>79</b>	77.5
75.5	78.5	<b>78</b>	76.5
74	77.5	<b>77</b>	75
73	76	<b>76</b>	74
72	75	<b>75</b>	73
71	74	<b>74</b>	72
70	73	<b>73</b>	71
68	72	<b>72</b>	70
67	71	<b>71</b>	69
66	70	<b>70</b>	68
65	69	<b>69</b>	67
64	67.5	<b>68</b>	66
62	66.5	<b>67</b>	65
61	65	<b>66</b>	64
60	64	<b>65</b>	63
58	62	<b>63</b>	61

**from frame size 200**

Efficiency in % at			
1/2	3/4	4/4	5/4
of full load			
95	96	<b>96.5</b>	96
94.5	95.5	<b>96</b>	95.5
94	95	<b>95.5</b>	95
93.5	94.5	<b>95</b>	94.5
93	94	<b>94.5</b>	94
92.5	93.5	<b>94</b>	93.5
91.5	92.5	<b>93</b>	92.5
91	92	<b>92</b>	91.5
90	91	<b>91</b>	90
89	90	<b>90</b>	89
88	89	<b>89</b>	88
87	88	<b>88</b>	87
86	87	<b>87</b>	85.5
85	86	<b>86</b>	84.5
84	85	<b>85</b>	83.5
83	84	<b>84</b>	82.5
82	83	<b>83</b>	81.5
81	82	<b>82</b>	80
80	81	<b>81</b>	79
79	80	<b>80</b>	78
78	79	<b>79</b>	77
77	78	<b>78</b>	76

**Efficiency, power factor**

The values indicated in the tables for efficiency and power factor refer to the rated output at 50 Hz. Partial load values are shown in the tables; these are reference values only.

Power factor at			
1/2	3/4	4/4	5/4
of full load			
0.81	0.88	<b>0.91</b>	0.91
0.80	0.87	<b>0.90</b>	0.91
0.77	0.86	<b>0.89</b>	0.90
0.75	0.84	<b>0.88</b>	0.89
0.73	0.83	<b>0.87</b>	0.88
0.71	0.81	<b>0.86</b>	0.88
0.69	0.80	<b>0.85</b>	0.87
0.68	0.79	<b>0.84</b>	0.87
0.67	0.78	<b>0.83</b>	0.86
0.65	0.77	<b>0.82</b>	0.85
0.64	0.75	<b>0.81</b>	0.85
0.62	0.74	<b>0.80</b>	0.84
0.61	0.72	<b>0.79</b>	0.83
0.60	0.71	<b>0.78</b>	0.82
0.58	0.70	<b>0.77</b>	0.81
0.57	0.69	<b>0.76</b>	0.80
0.55	0.67	<b>0.75</b>	0.79
0.54	0.66	<b>0.74</b>	0.79
0.53	0.65	<b>0.73</b>	0.78
0.52	0.63	<b>0.72</b>	0.77
0.50	0.62	<b>0.71</b>	0.76
0.49	0.61	<b>0.70</b>	0.75
0.48	0.59	<b>0.69</b>	0.74
0.47	0.58	<b>0.68</b>	0.74
0.46	0.57	<b>0.67</b>	0.73
0.45	0.56	<b>0.66</b>	0.72
0.44	0.55	<b>0.65</b>	0.71
0.43	0.54	<b>0.64</b>	0.70

## General

The mechanical design of all pole-changing motors corresponds to the single-speed motors. Pole-changing motors from frame size 225 with a 2-pole speed have the same bearings and the same shaft ends as the corresponding frame sizes of single-speed 2-pole motors.

## Voltage and frequency

The pole-changing motors in this technical list are supplied for the following rated voltages in 50 Hz systems: 400V, 500V or 690V. Within this range of voltages, the motors can be supplied with a non-standard winding for any specified rated voltage. Rated voltages below 400V as well as other frequencies are to be inquired.

## Output

Outputs shown in the tables are valid for duty type S 1 acc. to EN 60034-1. For coolant temperatures exceeding 40°C and altitudes of installation above 1000m sea level the same design data as for single-speed motors are valid.

## Torque

Starting of pole-changing motors can be accomplished from standstill at any number of poles. The output tables show the starting torques for direct-on starting and also the rotor classes. If possible, starts should be made at the lower speeds in order to avoid possible pull-up torques occurring at high speeds. This improves the acceleration and reduces starting heat losses in heavy starting conditions.

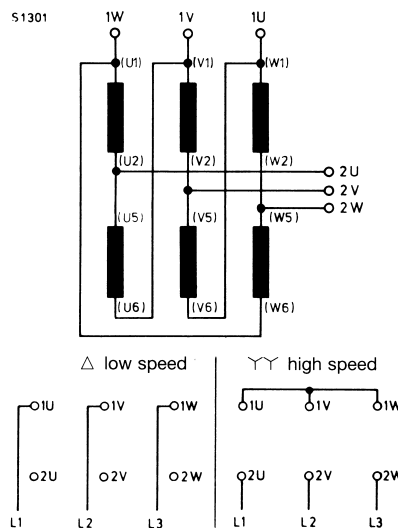
## Connection

The pole-changing motors shown in the tables are supplied for two or three specific speeds. Should it become necessary to supply output ratios not contained in the tables, motors with Dahlander connection can also be

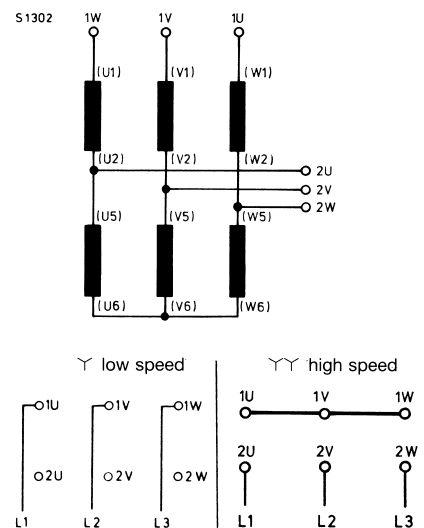
supplied with two separate windings. However, the output is then considerably lower than for a motor with Dahlander connection. The following alternatives are designated.

## Circuit diagrams for two speeds

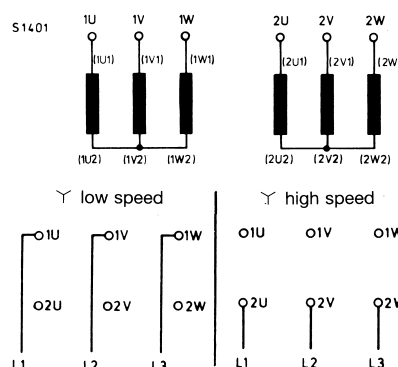
Speed ratio 1:2  
1 winding (Dahlander)  
Connection  $\Delta/\text{YY}$   
for constant torque  
4/2-, 8/4- and 12/6-pole



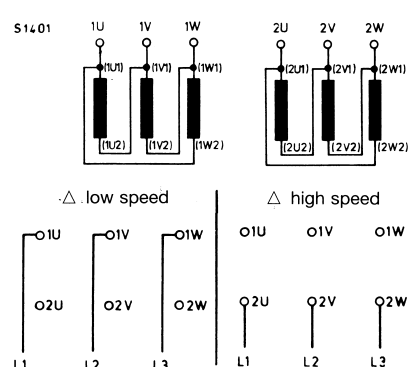
Speed ratio 1:2  
1 winding (Dahlander)  
Connection  $\text{Y}/\text{YY}$   
for quadratically decreasing torque (fan drive)  
4/2-, 8/4- and 12/6-pole



Speed ratio 1:1.5 or 1:1.33  
2 separate windings  
Connection  $\text{Y}/\text{Y}^1$   
for constant torque 6/4- and 8/6-pole  
for quadratically decreasing torque 6/4- and 8/6-pole



Speed ratio 1:1.5 or 1:1.33  
2 separate windings  
Connection  $\Delta/\Delta^1$   
for constant torque 6/4- and 8/6-pole  
for quadratically decreasing torque 6/4- and 8/6-pole



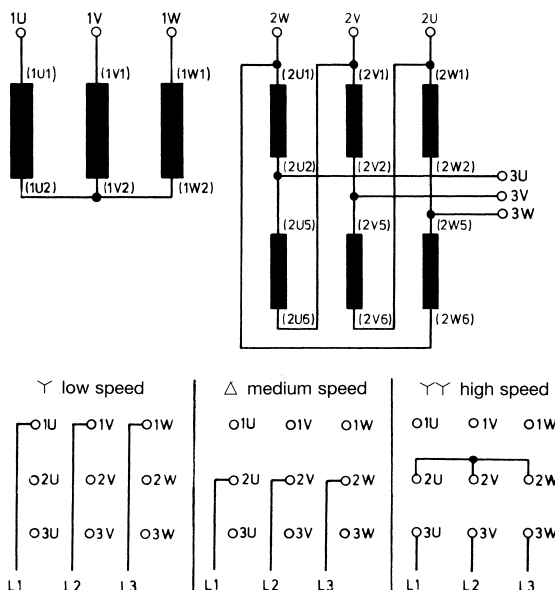
1 or  $\text{Y}/\Delta$  or  $\Delta/\text{Y}$

## Connections for motors with three speeds

### Circuit diagrams for three speeds

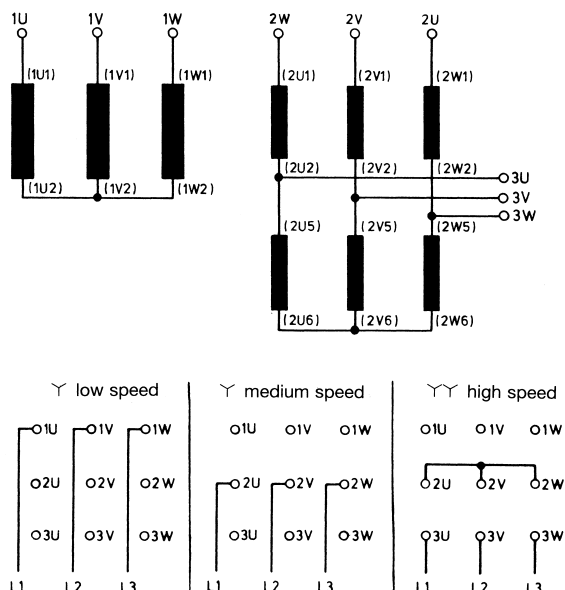
Speed ratio 1:2:4  
4/2-pole Dahlander connection  
8-pole separate winding  
Connection  $\Upsilon/\Delta/\Upsilon^2$   
for constant torque 8/4/2-pole

S1501



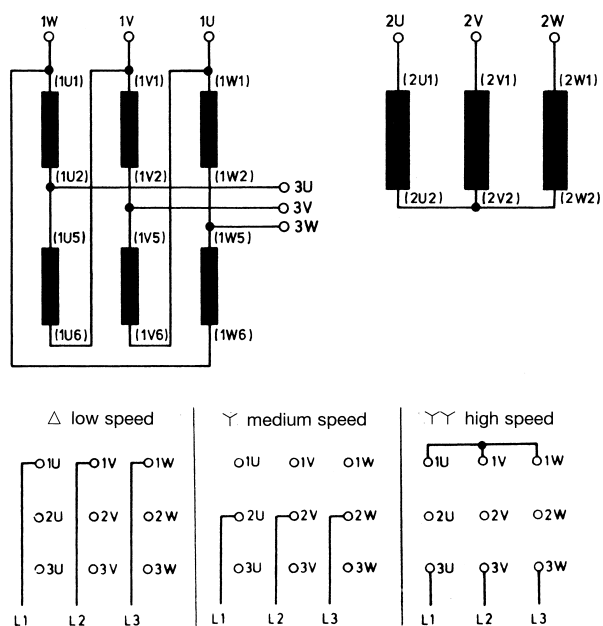
Speed ratio 1:2:4  
4/2-pole Dahlander connection  
8-pole separate winding  
Connection  $\Upsilon/\Upsilon/\Upsilon^2$   
for quadratically decreasing torque  
(fan drive) 8/4/2-pole

S1502



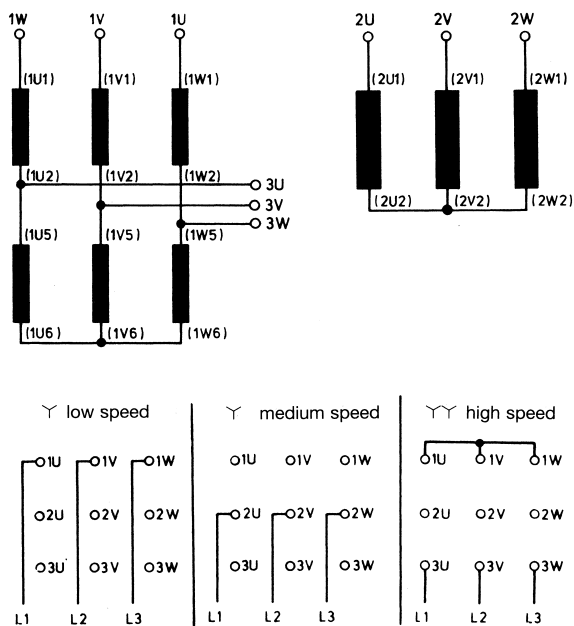
Speed ratio 1:1.33:2  
8/4-pole Dahlander connection  
6-pole separate winding  
Connection  $\Delta/\Upsilon/\Upsilon^2$   
for constant torque 8/6/4-pole

S1503



Speed ratio 1:1.33:2  
8/4-pole Dahlander connection  
6-pole separate winding  
Connection  $\Upsilon/\Upsilon/\Upsilon^2$   
for quadratically decreasing torque  
(fan drive) 8/6/4-pole

S1504



2 Separate winding is also possible in Δ connection

### **Thermal Motor Protection**

The optimal choice of thermal protection for the stator windings should be based on the operating conditions. Apart from the use of motor protection circuit breakers with thermally delayed overcurrent protection, motors can also be protected by means of semiconductor temperature detectors embedded in the winding. "Thermal motor protection" provides a higher degree of protection because the temperature is monitored at the critical point in the winding. Thus conditions such as reduced cooling or excessive ambient temperature, which are not picked up by a bimetallic tripping device, are detected. In special cases, e.g. reversing operation or increased switching frequency, the bimetallic tripping device cannot be adjusted to give adequate protection. For such cases it is essential to use thermal motor protection. Temperature detectors preferably in use are PTC (cold conductor thermistors). For special cases NTC (hot conductor thermistors) are also used. In order to protect all the windings of the motor, one detector is embedded in each phase of every winding.

### **Instruments for PTC thermistor detectors**

These detectors have the property of increasing their electrical resistance extremely steeply at a very well-defined temperature, the nominal shutdown temperature. This behaviour is utilized in the PTC-CALOMAT® instruments as a shut-down criterion. The relay in the instrument releases when the detector temperature reaches the critical value. Its fully insulated output acts upon the contactor control which isolates the motor from the mains and thus prevents damage. A broken connection is monitored by the system itself. The nominal shutdown temperature is determined by the characteristics of the thermistor used. Subsequent adjustment of the tripping temperature is therefore not possible. The nominal shutdown temperature is related to the insulation class of the motor. The detectors are connected in series and up to 6 pieces are connected to the detector instrument.

### **Instruments for NTC thermistor detectors**

NTC thermistors have the property of steadily decreasing their resistance as the temperature increases. This behaviour is utilized in the NTC-CALOMAT® instruments as a shutdown criterion. This allows subsequently adjusting of the shutdown point at the instrument. The thermistors must be connected to the instrument via a selector. This device is a separate module which selects the detector with the highest temperature. The connections between the selector and the instrument are monitored by the latter for a broken connection. The shutdown point is adjusted at the instrument in our factory. The thermal motor protection devices CALOMAT® can be supplied in various mechanical and electrical designs. Details are indicated in our technical list "CALOMAT® Devices for Thermal Motor Protection".

### **Winding protection contacts**

(Thermal contacts)  
Another possibility to monitor the winding is given by the use of winding protection contacts. They are located as closed or open contacts into the stator winding. In case of overloading the motor is switched off. There is no protection given in case of a stalled rotor and therefore additional motor protection circuit breakers are to be provided, if necessary.

### **Radio interference suppression**

In accordance with EN 55014 three-phase squirrel cage motors are considered as "radio interference-suppressed" to radio interference level FN.

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# Inverter operation, mechanical features

## Basic concepts Bearing currents Mechanical limit speeds

### Basic concepts

Without modification of the electrical and mechanical construction the optimized design and manufacture of our three-phase motors allows an inverter operation for most

motors of the Series A... (externally cooled) and D... (Protection type EEx d). The permissible basic data and parameters for inverter operation are summarized in the

Technical List UN 03. The mechanical features to be observed as a result of higher speeds are indicated below.

### Bearing currents

It is known about mains-operated motors that due to the magnetic asymmetries a voltage is produced along the mechanical shaft. When this shaft voltage exceeds a peak value of about 500 mV, bearing currents can occur, which result in a bearing damage.

This phenomenon occurs only in larger motors. In order to avoid bearing currents the adjacent bearing will be insulated from frame size 315. Bearing insulation is

made by insulating the bearing seat on the motor shaft or by using current-insulated antifriction bearings.

These shaft voltages and bearing currents can be increased (typically by approx. 30% to 50%) at inverter operation.

For pulse-inverter operation additional high-frequency bearing voltages and bearing currents can also occur (Common Mode bearing currents and circulating currents).

The bearing currents depend on the motor size and the inverter design (pulse frequency, pulse modulation, output filter).

Previous experiences showed that for an operation of Loher-Motors with the pulse inverters DYNAVERT® T (pulse frequency 3 kHz up to 7.5 kHz, pulse modulation by voltage vector control, standard du/dt-output filter) no damages were caused by the occurring bearing currents.

### Mechanical limit speeds

For an operation over the rated frequency it must be observed that the maximum speeds are limited by the limit values of the antifriction bearings, the critical rotor speed and the strength of the rotating

parts. In accordance with EN 50014 for motors used in the hazardous area of Zone 1 or 2, the circumferential speed is also limited and consequently the speed of plastic fans.

**Further special measures are partially required for the limit speeds indicated in the tables below.**

Mechanical limit speeds for motors without explosion protection of the frame sizes 90 to 355

Number of poles	Frame size	90	100	112	132	160	180	200	225	250	280	315	355
2	n/min <sup>-1</sup>	6000	6000	6000	6000	6000	6000	6000	5200	4800	4200	3800	3600
	f/Hz	100	100	100	100	100	100	100	87	80	70	63	60
4	n/min <sup>-1</sup>	4500	4500	4500	4500	4500	4500	4500	4500	4500	3900	3000	2700
	f/Hz	150	150	150	150	150	150	150	150	150	130	100	90
6	n/min <sup>-1</sup>	4000	4000	4000	4000	4000	4000	4000	4000	4000	3400	2800	2600
	f/Hz	200	200	200	200	200	200	200	200	200	170	140	130
8	n/min <sup>-1</sup>	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	2700	2550
	f/Hz	200	200	200	200	200	200	200	200	200	200	180	170

Mechanical limit speeds for EEx d motors of the frame sizes 71 to 315

Number of poles	Frame size	71	80	90	100	112	132	160	180	200	225	250	280	315
2	n/min <sup>-1</sup>	6000	6000	6000	6000	6000	5600	5000	3900	4500	3900	3800	3600	3800
	f/Hz	100	100	100	100	100	93	83	65	75	65	63	60	63
4	n/min <sup>-1</sup>	4500	4500	4500	4500	4500	4500	3900	3500	3000	3000	3800	2580	3000
	f/Hz	150	150	150	150	150	150	130	117	100	100	127	83	100
6	n/min <sup>-1</sup>	4000	4000	4000	4000	4000	4000	3900	3500	3000	3000	2500	2300	2800
	f/Hz	200	200	200	200	200	200	195	175	150	150	125	115	140
8	n/min <sup>-1</sup>	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	2500	2300	2700
	f/Hz	200	200	200	200	200	200	200	200	200	200	167	153	180

The limit speeds of this table are also applicable to motors of the protection type 'n', EEx e II and standard motors used in the hazardous area of Zone 2.

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## Relubrication intervals, grease life, grease quantities

### Reduction of the grease life or of the relubrication intervals

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#### Relubrication intervals, grease life, grease quantities

All Loher motors up to frame size 280 have permanent lubrication. According to experience the filled-in grease will be sufficient for several years.

Motors from frame size 315 (on request also the frame sizes 160 up to 280) are fitted with a regreasing and grease regulation.

The grease life, grease quantities and relubrication intervals for an

operation at rated speed (for 50 Hz) of A-motors and EEx d-motors are indicated in the chapters

- **Mechanical construction**
- **Type series A.../ E...** and
- **Mechanical construction, Type series D...**

**In case of higher speeds than the rated speed** the grease life and relubrication intervals  $t_f$  are reduced.

Referred to the corresponding time  $t_{f\ 50}$  at 50 Hz this results in the reduction indicated in the table below.

#### Reduction of the grease life or of the relubrication intervals

Frequency Hz	60	70	80	90	100
$t_f / t_{f\ 50}$	0.75	0.65	0.55	0.50	0.45

The indicated relubrication intervals are applicable for an ambient temperature of max. 40°C.

For every 15°C temperature rise, the lubrication interval is to be reduced to half of the value shown in the table.

**Further information about inverter-operated motors is indicated in the**

<b>Technical List UN03</b>
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# Order-Checklist

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For verification of the required order data  
a corresponding form is available:

**Order-Checklist**  
(to be printed and completed see Appendix)

A Word-file to be completed and printed is available in the CD version of this technical list.

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# Three-phase motors to special regulations

VIK  
UL  
CSA  
NEMA

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## VIK

On customer request three-phase motors are manufactured according to the guidelines of the VIK (Verband der Industriellen Energie- und Kraftwirtschaft e.V. – Committee of the Industrial Power and Power Utilities).

The outputs correspond to the type-specific standard outputs in this list. The mechanical design is indicated in the table.

The design of pole-changing motors can optionally be matched to the technical requirements of the VIK.

The **Loher “CHEMSTAR” Motor** includes all requirements to the VIK-guidelines with further important features for the chemical industry in a design package.  
See section “**Loher CHEMSTAR Motor**” in this technical list.

## UL

Three-phase motors of the type series **AN.A** are listed by the Underwriters Laboratories Inc. in accordance with the Standards

UL 1004 – Electric Motors  
CSA C22.2 No. 100 – Motors and Generators

as “Recognized Component”.

**Certificate of Compliance No. 040202 – E215983**

Frame size: 090–355  
Number of poles: 2,4,6  
Enclosure: IP 55  
Electrical data: max. 600V, 50/60 Hz, max. 3600 min<sup>-1</sup>, max. 850A.

As an option the motors can be delivered with attached pulse generator.

Project-dependent it is also possible that other designs can be certified to UL on request.

## CSA

Three-phase motors of the type series **ANGA** can be delivered according to the requirements to CSA Standard C22.2 No. 100-95.

**CSA Type Approval No. 015264X0000**

Frame size: 090–315  
Enclosure: IP 55  
Electrical data: max. 660V, 60 Hz

## NEMA

Motors of the type series **ANGA** / **AMGK** / **DN.W** can regarding to the electrical design be delivered to the “NEMA Standards Publication No. MG1”.

Flange motors can be made as special design with flange and shaft end to NEMA. Flange and shaft design is to be indicated in the order.

An adaptation of the foot dimensions for the motors in mounting type IM B3 is not possible.

# Explosion protection

## Summary of standards

### Certificates

### Initial operation

#### Explosion protection summary of standards

Explosion-proof three-phase motors comply with the European standards.  
The European Standards are recognized by all CENELEC1 member countries.

CENELEC member countries are the national electrotechnical committees of Belgium, Denmark, Germany, Finland, France, Greece, Ireland, Iceland, Italy,

Luxembourg, Netherlands, Norway, Austria, Portugal, Sweden, Switzerland, Spain, the Czech Republic and the United Kingdom (UK).

Apparatus	EN
General regulations	50014
Pressurized enclosure	50016
Flameproof enclosure	50018
Increased safety	50019
Intrinsic safety	50020
Type of protection "n" (Zone 2)	50021
Encapsulation	50028
Intrinsically safe electrical systems	50039
Apparatus "Dust"	50281-1-1
Apparatus "Dust"	50281-2-1
Apparatus "Dust"	61241-2-2
Electrical installations in hazardous areas (gases, vapours, fumes)	60079-14
Electrical installations in hazardous areas (dust)	50281-1-2
Maintenance of electrical installations in hazardous areas	60079-17
Classification of zones (gases, vapours, fumes)	60079-10
Basic concepts & Methodology	1127-1

#### Certificates

Motors of this technical list have been certified by the PTB (= Physikalisch Technische Bundesanstalt). EC-type-examination certificates of the PTB for explosion-

proof electrical apparatus according to the EN standards are valid in all EC member countries.

Electrical and mechanical design other than certified and laid down in this technical list requires either the issue of a supplement or a new certificate.

#### Initial operation

According to the regulations for electrical equipment in hazardous areas (Verordnung über elektrische Anlagen in explosionsgefährdeten Räumen/ElexV) electrical equipment is only allowed to be put into operation in hazardous areas, when an EC-type-examina-

tion certificate of the PTB or of another test authority stated in ElexV is available.

For the use of electrical equipment in hazardous facilities and storage rooms EN 60079-14/VDE 0165-1 "Installation of electrical equipment

in hazardous areas" must be observed. Furthermore, the official regulations of the relevant supervising authority and the employer's liability insurance association are applicable in general or for individual cases.

1 CENELEC = European Committee for Electrical Standardization

## Hazardous areas ATEX 100a Device identification

### Hazardous areas

Hazardous areas are those areas where an explosive atmosphere at a dangerous extent can occur due to local and operational conditions.

Dangerous areas are differentiated under that aspect, how often and for what period of time a dangerous concentration of an

explosive mixture exists, and are identified as zones.

The classification into zones influences the ignition protection to be selected and consequently the design of the electrical equipment. The table shows the zone classification of hazardous areas due to gas and includes data on the re-

spective three-phase motors to be used.

Whether an area in the open air or in an enclosed location is to be considered as hazardous in accordance with the regulations or provisions can exclusively be judged by the competent supervising authority.

### Ex-directive 94/9/EC – ATEX 100a –

With Directive 94/9/EC the explosion protection will be fully harmonized in Germany and in the other member states of the European Community.

The legal provisions in accordance with the new law are valid as of July 1, 2003. Since that date the devices and protective systems are only allowed to be put on the

market according to Directive 94/4/EC.

In accordance with Directive 94/9/EC and Directive 1999/92/EC only specific electrical equipment or devices are allowed to be used in the zones (see table: Assignment of devices (electrical equipment) to zones). The devices are classified into device groups and categories.

### Assignment of devices (electrical equipment) to zones

Zone	Potentially explosive atmosphere	Device classification	
		Device group	Category
0	always, long time or frequently	II (other hazardous areas due to gases or dusts)	1G
20			1D
1	occasionally		2G
21			2D
2	rarely, short time		3G
22			3D
Operation at danger of explosion	always, long time or frequently	I (Mining)	M1
Shutdown at danger of explosion	occasionally		M2

The device identification indicates the device group and the category.

The device identification is determined as follows:

e.g. CE 0102  II 2 G EEx d IIC T3

– **CE** The symbol of conformity CE is for “Communauté Européenne” (“European Community”)

By means of the CE-Marking the manufacturer declares that the product concerned has been manufactured in compliance with all applicable regulations and requirements of the Directive 94/9/EC and that the product was subject to the relating conformity assessment procedures.

– **0102** Identification number of the supervising authority, the PTB for Loher

–  Symbol for preventing explosions according to the Directive 94/9/EC

## Hazardous areas

- **I or II**      Device group
- **1, 2 or 3**    Category
- **G or D**      explosive atmosphere (G= Gas / D= Dust)
- **EEx**          Explosion protection (protective design) according to European Standards
- **d**            Type of protection (here e.g. Flameproof Enclosure "d", see 'Explanation of protection types')
- **IIC**          Explosion group (see next page: Table 'Examples for the assignment of combustible gases and vapours')
- **T3**          Temperature class (see next page: Table 'Temperature classes')

## Hazardous areas

Combustible substances	Zone acc. to EN 60079-14	Explanations	Examples	Permissible electrical equipment	
				general	Motors
Gases, vapours and fumes	Zone 0	Areas where a dangerous explosive atmosphere is <u>always</u> or available over long-time periods.	Normally this refers only to the inside of containers or to the inside of equipment.	Within Zone 0 only electrical equipment especially certified may be operated.	The operation of explosion-proof motors, no matter what kind of enclosure, is not permitted. Exceptions can only be made by the local authorities.
	Zone 1	Areas where a dangerous explosive atmosphere is <u>occasionally</u> to be expected.	It can be included: The immediate vicinity of Zone 0, the inside of equipment, the area close to – feeding openings – filling and emptying equipment – easily breakable equipment or ducts of glass or ceramic etc.	Electrical equipment must be explosion-proof by one of the enclosures acc. to EN 50014.	Within Zone 1 explosion-proof motors of "Flameproof Enclosure" or "Increased Safety" or of "Pressurized Enclosure" have to be installed.
	Zone 2	Areas where a dangerous explosive atmosphere <u>rarely and only for a short time</u> is to be expected.	It can be included: Areas around Zones 0 and 1. Areas at flange connections with flat gaskets at pipings in closed rooms.		Within Zone 2 explosion-proof motors and EEx nA II motors can be operated.
Dusts	Zone 20	Area where an explosive atmosphere, as a cloud, is present <u>continuously for long periods or frequently</u> , capable of producing combustible dust in mixture with air.	As a rule are only included the inside of equipment (mills, dryers, mixers, delivery pipe, silos, etc.)	Within Zone 20 only electrical equipment with special certification may be operated.	Operation of explosion-proof motors is not permitted. Exceptions can only be made by the local authorities.
	Zone 21	Area where <u>during normal operation</u> an explosive atmosphere, as a cloud, is <u>occasionally present</u> , capable of producing combustible dust in mixture with air.	This zone can include: Areas in direct vicinity of filling and emptying equipment and areas, where dust accumulations occur, which during normal operation may give rise to an explosive mixture of combustible dust with air.		Within Zone 21 motors in "Flameproof Enclosure" or "Increased Safety" or "n" may be operated, when they meet at least the requirements of enclosure IP 6X.
	Zone 22	Area where <u>during normal operation</u> an explosive atmosphere, as a cloud, <u>does not occur or for only a short period</u> , capable of producing combustible dust in mixture with air.	It can be included: Areas near to equipment, when dust from leakages can penetrate outside (e.g. mill rooms).		Within Zone 22 motors without EC-type-examination certificate (with EC Declaration of conformity of the manufacturer) may be used, when they are at least designed to enclosure IP 5X.

Note: For mine-safety approved equipment the VDE 0118 regulations for installation are applicable. Underground mining areas are not divided into zones.

Remark I: Layers, deposits and accumulations of combustible dust are to be considered like any other cause, which may give rise to an explosive atmosphere.

Remark II: Such status is considered as normal operation, where equipment is used according to its design parameters.

Remark III: For Zone 22 with conductive dust such equipment like for Zone 21 is to be used.

## Temperature classes and groups

### Temperature classes and groups

Combustible gases and vapours are divided into temperature classes according to their ignitibility and into groups according to their puncture capacity. The use of symbols for type of enclosure, group and temperature class indi-

cates that the three-phase motor may be installed without danger in hazardous areas depending on the zone classification.

The sequence of symbols for the group and temperature class has been chosen in a way that the mo-

tors fulfilling the requirements of a certain group and temperature class also comply with the requirements of all lower groups or classes.

### Temperature classes

Temperature class of electrical equipment	Max. surface temperature of electrical equipment	Ignition temperature of gases or vapours
T1	450°C	> 450°C
T2	300°C	> 300°C
T3	200°C	> 200°C
T4	135°C	> 135°C
T5	100°C	> 100°C
T6	85°C	> 85°C

### Examples for the assignment of combustible gases and vapours

Group	Temperature classes											
	T1		T2		T3		T4		T5		T6	
	Material	Ignition temperature °C	Material	Ignition temperature °C	Material	Ignition temperature °C	Material	Ignition temperature °C	Material	Ignition temperature °C	Material	Ignition temperature °C
II II A <sup>2</sup>	Acetone	540	i-Amylace-tate	380	Benzines		Acetalde-hyde	140				
	Ethane	515	n-Butane	365	Petrols	1						
	Ethylacetate	460	n-Butyl-alcohol	340	Special fuels	1						
	Ethylchlori-de	510	Cyclohexa-none	430	Diesel fuels	1						
	Ammonia	630	1,2-Dichlo-rethane	440	Fuel oils	1						
	Benzene	555	Acetic anhydride	330	n-Hexane	240						
	Acetic acid	485										
	Carbonoxi-de	605										
	Methane	595										
	Methanol	455										
	Methylchlo-ride	625										
	Naphtaline	520										
	Phenol	595										
	Propane	470										
	Toluene	535										
II II B <sup>2</sup>	City/town gas		Ethylalcohol	425	Hydrogen sulfide	270	Ethyl ether	180				
	(Coal gas)	560	Ethylene	425								
			Ethylene oxide	440								
II II C <sup>2</sup>	Hydrogen	560	Acetylene	305							Carbon disulphide	95

<sup>1</sup> Ignition temperature is between 220 to 300°C depending on the composition, in special cases over 300°C.

<sup>2</sup> The classification II A, II B, II C is not applicable for electrical equipment in protection type "Increased Safety", but only for "Flameproof Enclosure".

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## Maintenance of explosion protection during operation

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### Maintenance of explosion protection during operation

Electrical machinery has to be protected against an inadmissible temperature rise due to overloading. The selection of protective devices depends not only on the duty type, but also on the design and suitability of the electrical equipment.

Protective devices for overcurrents with current-dependent delayed release acc. to EN 60947, e.g. motor protective switches, in all outer wires have to be adjusted to the rated motor current.

Furthermore they have to be selected so that a thermal motor protection is given, even in case of a short circuit (i.e. with stalled rotor). This requirement is considered as fulfilled, if the trip time which is indicated in the tripping characteristics (initial temperature 20°C) for the ratio  $I_A/I_N$ , is not higher than the given time of tem-

perature rise  $t_E$  for the respective ignition group.

Windings in  $\Delta$ -connection are preferably to be protected so that the tripping devices or relays are connected in series with the winding phases. For selection and adjustment of the tripping devices the rated value of the phase current, i.e. 0.58 times of the motor rated current, is taken as basis. If, however, the tripping devices are located in the mains power supply, protective measurements must be provided, ensuring a sufficient motor protection even if one phase fails.

For pole-changing motors current-dependent delayed tripping devices or relays have to be provided for each speed step, which have to be locked against each other.

Thermal motor protection for direct temperature monitoring, e.g. with PTC thermistor sensors only in connection with CALOMAT CK 14 or additionally for over-current protection.

Motors with thermal motor protection as sole protection on request.

The motors are only allowed to be used for continuous duty and only for normal not frequently repeated starting, during which no considerable temperature rise occurs for starting.

The values for the time of temperature rise  $t_E$  in the various ignition groups as well as for the starting current ratio  $I_A/I_N$  are stated on the nameplate of the respective motor and are also shown in the PTB-test certificate.

Explanation of protection types

Motor in protection type “n“

Motor in protection type “n“

Explosion protection in protection type “n“ for hazardous areas of Zone 2 according to EN 50014 and EN 50021.

Identification according to the EC Directive:



**Certificate:**  
EC Declaration of conformity from the manufacturer.  
Terminal box and cable glands for the type AMGK see section ENG.

Example: EC Declaration of Conformity

LOHER GMBH

**FLENDER**  
LOHER

**EG-Konformitätserklärung**

Hersteller:

Loher GmbH

Anschrift:

Hans-Loher-Straße 32  
D-94099 Ruhstorf/Rott

Produktbezeichnung:

Drehstrom-Asynchronmaschinen der Zündschutzart "n"  

A . . K-063 . . . bis

A . . K-800 . . .

A . . L-063 . . . bis

A . . L-800 . . .

J . . K-160 . . . bis

J . . K-800 . . .

Das bezeichnete Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinien überein:

94/9/EG

Richtlinie des Europäischen Parlaments und des Rates zur Angleichung der Rechtsvorschriften für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen

Die Übereinstimmung mit den Vorschriften dieser Richtlinien wird nachgewiesen durch die vollständige Einhaltung folgender Normen:

EN 50014

EN 50021

EN 60034  
EN 60204-1

Erstmalige Anbringung der CE-Kennzeichnung: 2000

Das bezeichnete Produkt ist zum Einbau in eine andere Maschine bestimmt. Die Inbetriebnahme ist solange untersagt, bis die Konformität des Endproduktes mit der Richtlinie 89/392/EWG festgestellt ist.

Erstausgabe: 10.00  
Ruhstorf/Rott, 2003-06-23

Dr. Neupert  
Leiter Qualitätssicherung

Diese Erklärung ist keine Zusicherung von Eigenschaften im Sinne der Produkthaftung.  
Die Sicherheitshinweise der Produktdokumentation sind zu beachten.

Rev. B / 23.06.2003

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EC declaration of conformity

ENGLISH

The product indicated is in conformity with the requirements of the following European Directives:  
94/9/EC Directive of the European Parliament and the Council on the approximation of the Laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres

Conformity with the requirements of these Directives is testified by complete adherence to the following standards:  
...  
First application of the CE-Marking: 2000

The indicated product is intended for fitting into another machine. Commissioning is prohibited until the conformity of the product with Directive 89/392/EEC has been established.

This declaration is not a warranty of attributes within the meaning of the Law concerning Product Liability.  
The safety notes given in the product documentation must be observed!

Déclaration de Conformité CE

FRANCAIS

Le produit décrit est en conformité avec les prescriptions des Directives Européennes suivantes:  
94/9/CEE Directive du Parlement Européen et du Conseil concernant le rapprochement des législations des Etats Membres pour les appareils et les systèmes de protection destinés à être utilisés en atmosphères explosibles

La conformité aux prescriptions de ces Directives est démontrée par sa conformité intégrale aux normes suivantes:  
...  
Première application du Marquage CE: 2000

Le produit décrit est destiné à être intégré dans une autre machine. La mise en service est défendue aussi longtemps que la conformité du produit final avec la Directive 89/392/CEE n'a pas été établie.

Cette déclaration n'est pas une garantie des propriétés au sens de la loi responsabilité civile du fait des produits.  
Respecter les règles de sécurité de la documentation du produit!

Declaración de Conformidad CE

ESPAÑOL

El producto especificado concuerda con las prescripciones de las siguientes Directivas Europeas:  
94/9/CEE Directiva del Parlamento Europeo y del Consejo relativa a la aproximación de las legislaciones de los Estados Miembros sobre los aparatos y sistemas de protección para uso en atmosferas potencialmente explosivas

La conformidad con las prescripciones de estas Directivas queda justificada por haberse cumplido totalmente las siguientes normas:  
...  
Primera aplicación del Marcado CE: 2000

El producto especificado está destinado a su montaje en otra máquina. Se prohíbe la puesta en servicio hasta tanto se haya comprobado que el producto final concuerda con la Directiva 89/392/CEE.

Esta declaración no garantiza ninguna propiedad en el sentido de la Ley de responsabilidad civil sobre productos.  
Observar las indicaciones de seguridad en la documentación del producto!

Dichiarazione di Conformità CE

ITALIANO

Il prodotto indicato è in conformità col requisiti delle seguenti Direttive Europee:  
94/9/CEE Direttiva del Parlamento Europeo e del Consiglio concernente il ravvicinamento delle legislazioni degli Stati Membri relative agli apparecchi e sistemi di protezione destinati a essere utilizzati in atmosfera potenzialmente esplosiva

La conformità ai requisiti delle presenti Direttive viene provata dal completo rispetto delle seguenti norme:  
...  
Prima applicazione della Marcatura CE: 2000

Il prodotto indicato è destinato a far parte di un'altra macchina. La messa in servizio non può essere eseguita finché non sia verificata la conformità del prodotto finale alla Direttiva 89/392/CEE.

La presente dichiarazione non rappresenta una garanzia ai sensi della legge sulla responsabilità da prodotto.  
Vanno osservate le istruzioni di sicurezza riportate nella documentazione del prodotto!

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FLENDER LOHER Business Unit IM

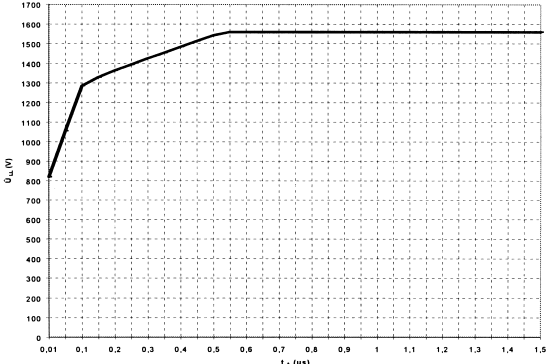


## Explanation of protection types

### Motor in protection type “n“, inverter operation

#### Inverter operation

The motors in protection type “n“ require together with the appropriate inverter the approval and certificate by an authority.

<b>R-No. 20000d</b>	<b>Loher GmbH</b> Abteilung Prüffeld/Test Department Postfach 1164 D-94095 Ruhstorf	<b>FLENDER</b> LOHER
<p align="center"><b><u>INVERTER SUPPLY WITH EXPLOSION-PROTECTED LOW-VOLTAGE THREE-PHASE MOTORS OF FLAME-PROOF TYPE OF ENCLOSURE AND OF PROTECTION TYPE N (NON SPARKING) FOR TEMPERATURE CLASSES T1 - T4</u></b></p> <p>To operate explosion-protected three-phase motors with inverters, the following preconditions must be met:</p> <ol style="list-style-type: none"><li>1. The output voltage of the inverter must be adjusted in such a way that in the frequency range up to the rated frequency of the motor an almost linear relationship between the (fundamental) voltage and the (fundamental) frequency is kept, i. e. the practically constant motor flux must be kept in accordance with the rated data. Motors operating above the 1.1 fold rated frequency are only permitted if a corresponding rating plate for inverter operation is fixed on the motor.</li><li>2. <math>I_{\text{contin}}</math> is the value to which the inverter management limits the current in continuous duty. <math>I_{\text{contin}}</math> is to be adjusted to the continually permitted motor rated current as a maximum in accordance with the rating plate for inverter operation attached to the motor or in conformity with the value determined in the describing documents for inverter operation (R-No.). In case of motors of flame-proof enclosure, which are nameplated only for sinusoidal operation and sole protection, <math>I_{\text{contin}}</math> is to be adjusted as a maximum to the rated current indicated on the rating plate.</li><li>3. <math>I_{\text{short}}</math> is the value to which the inverter management limits the current in case of short-time overload for a period of max. <math>t_{\text{short}}</math> <math>I_{\text{short}}</math> is to be adjusted to <math>1.5 \times I_{\text{contin}}</math> as a maximum.</li><li>4. <math>t_{\text{short}}</math> is the period for which the inverter allows an exceeding of <math>I_{\text{contin}}</math>. <math>t_{\text{short}}</math> is to be adjusted to 60 sec. as a maximum.</li><li>5. The built-in temperature sensors (PTC thermistors) which must be suitable for sole protection are to be connected to a tripping device complying with Directive 94/9/EC with an EC-Type-Examination Certificate as CK140: PTB 02 ATEX 3154 or CK144/145: PTB 02 ATEX 3049.</li><li>6. Voltage peaks (especially with PWM inverters with long motor cable)<ol style="list-style-type: none"><li>a) The design of the terminal box concerning the air- and creepage distances permits the inverter operation with voltage peaks (<math>\hat{U}_{LL}</math> and <math>\hat{U}_{LE}</math>) up to <math>\hat{U} = 1866 \text{ V}</math>.</li><li>b) To avoid the formation of partial discharge, the voltage at the motor terminals must be limited, depending on the rise time, to values below the characteristic curve of the chart “dielectric strength curve” (see below).</li></ol></li></ol> <p>Ruhstorf, 2004-02-20</p> <p align="right">Loher GmbH</p> <p align="right">QM-Hofbauer</p> <p>Spannungsfestigkeitskurve:</p> 		

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## Explanation of protection types

### Protection type 'Increased Safety' "e"

#### Protection type 'Increased Safety' "e"

Explosion-proof three-phase motors in protection type "Increased Safety" comply with the European Standards EN 50014 and EN 50019 and are designed in such a way that under normal operating conditions no inadmissibly high temperatures and sparks will occur. Single-speed motors can on request also be delivered accord-

ing to the technical requirements of the VIK (Verband der Industriellen Energie- und Kraftwirtschaft e.V. – Committee of the Industrial Power and Power Utilities).

Identification according to the EC Directive:

 II 2 G EEx e II

#### Inverter operation


The motors in protection type "e" require together with the appropriate inverter the approval and certificate by an authority.

#### Certificate:

EC-type-examination certificate by an authority as designated.

### Example: EC-type-examination certificate

**Physikalisch-Technische Bundesanstalt**  
Braunschweig und Berlin



**EG-Baumusterprüfbescheinigung**

(1) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen – Richtlinie 94/9/EG

(2) EG-Baumusterprüfbescheinigungsnummer

**PTB 98 ATEX 3515**

(3) Gerät: Drehstrommotoren der Typenreihe E...-250...

(4) Hersteller: Loher Aktiengesellschaft

(5) Anschrift: Hans-Loher-Str. 32, 94099 Ruhstorf

(6) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(7) Die Physikalisch-Technische Bundesanstalt bescheinigt als benannte Stelle Nr. 0102 nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften vom 23. März 1994 (94/9/EG) die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie.

(8) Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht PTB Ex 98-30018 festgelegt.


(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

**EN 50014:1997** **EN 50019:1994**


(10) Falls das Zeichen „X“ hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.


(11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Bau des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes.

(12) Die Kennzeichnung des Gerätes muß die folgenden Angaben enthalten:

 II 2 G EEx e II T1, T2, T3 oder T4

Zertifizierungsstelle Explosionsschutz Braunschweig, 04. Februar 1999  
Im Auftrag

  
Dr.-Ing. U. Engel  
Regierungsdirektor



Seite 1/2

EG-Baumusterprüfbescheinigungen ohne Unterschrift und ohne Siegel haben keine Gültigkeit.  
Diese EG-Baumusterprüfbescheinigung darf nur unverändert weiterverbreitet werden.  
Auszüge oder Änderungen bedürfen der Genehmigung der Physikalisch-Technischen Bundesanstalt.  
Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

Original: German Translation

**Physikalisch-Technische Bundesanstalt** **PTB**  
Braunschweig und Berlin

(1) **EC-TYPE-EXAMINATION CERTIFICATE**  
(Translation)

(2) Apparatus and protective systems for the specified use in hazardous areas – Directive 94/9/EC

(3) EC-type-examination Certificate Number

**PTB .. ATEX ....**

(4) Apparatus: Three-phase motors of the type series E.....

(5) Manufacturer: Loher Aktiengesellschaft

(6) Address: 94099 Ruhstorf

(7) The type of construction of this apparatus as well as the different permissible variations are specified in the Schedule to this Prototype Test Certificate.

(8) The Physikalisch-Technische Bundesanstalt, being the Approved Certification Body No. 0102 in accordance with article 9 of the Council Directive of the European Communities of March 23, 1994 (94/9/EC), confirms the compliance with the basic safety and health regulations for the design and construction of apparatus and protective systems for the specified use in hazardous areas in accordance with Annex II to the directive. The results of this test have been recorded in the confidential test report PTB Ex 98-30...


(9) The basic safety and health regulations have been found to comply with

**EN 50014:1997** **EN 50019:1994**

(10) If the certificate number is supplemented by the symbol "X", the special conditions for the safe use of the apparatus are indicated in the Schedule to this certificate.

(11) This EC Prototype Test Certificate only refers to the design and construction of the specified apparatus in accordance with the Directive 94/9/EC. Further requirements of this directive are applicable for the manufacture and marketing of this apparatus.

(12) The apparatus marking shall include the following code:

 II 2 G EEx e II T1, T2, T3 or T4

Certification Body Explosion Proofness Braunschweig,  
By order

Dr.-Ing. U. Engel  
Regierungsdirektor

Page 1/2

EC-type-examination Certificates without signature and official stamp shall not be valid.  
This EC-type-examination may be circulated only without alteration.  
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Explanation of protection types

Protection type ‘Increased Safety’ “e”

Physikalisch-Technische Bundesanstalt  
Braunschweig und Berlin

PTB

(13)

Anlage

(14)

EG-Baumusterprüfbescheinigung PTB 98 ATEX 3515

(15)

Beschreibung des Gerätes  
Drehstrom-Asynchronmotoren der Typenreihe E...-250... in der Zündschutzart Erhöhte Sicherheit "e", deren mechanische Ausführung in dem Prüfbericht gemäß der nachfolgenden Ziff. 16 und deren elektrische Ausführung nach Antrag des Herstellers jeweils in einem zugehörigen Datenblatt festgelegt ist.

(16)

Prüfbericht PTB Ex 98-30018

(17)

Besondere Bedingungen  
nicht zutreffend

(18)

Grundlegende Sicherheits- und Gesundheitsanforderungen  
durch Normen erfüllt

Zertifizierungsstelle Explosionsschutz  
Im Auftrag  
Dr.-Ing. U. Engel  
Regierungsdirektor

Braunschweig, 04. Februar 1999

Seite 2/2

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Original: German

Translation

Physikalisch-Technische Bundesanstalt  
Braunschweig und Berlin

PTB

(13)

Schedule

(14)

to EC-TYPE-EXAMINATION CERTIFICATE PTB .. ATEX ....

(15)

Description of the apparatus  
Three-phase induction motors of the type series E... of the type of protection Increased Safety "e", the mechanical design of which is specified in the test report according to the following item 16 and its electrical design upon application of the manufacturer in each case in an appropriate data sheet.

(16)

Test Report PTB Ex 98-30...

(17)

Special conditions  
not applicable

(18)

Basic safety and health regulations  
compliance with standards

Certification Body Explosion Proofness  
By order  
Dr.-Ing. U. Engel  
Regierungsdirektor

Braunschweig,

Page 2/2

EC-type-examination Certificates without signature and official stamp shall not be valid.  
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Example: Datasheet EC-type-examination certificate

Physikalisch-Technische Bundesanstalt  
Braunschweig und Berlin

PTB

Datenblatt 01 zur EG-Baumusterprüfbescheinigung PTB 98 ATEX 3515

für den Drehstromasynchronmotor Typ E.GV-250MB-02

Bemessungsgrößen und Daten

Diese Bescheinigung gilt unter der Voraussetzung, daß sich die Motoren dieses Typs hinsichtlich der elektrischen und thermischen Beanspruchung nur unwesentlich von dem geprüften Muster unterscheiden, für die folgenden Ausführungen:

Leistung: 36 kW

Spannung: 110 230 400 500 690 V

Strom: 220 106 61 48,5 35 A

Leistungsfaktor: 0,91

Frequenz: 50 Hz

Drehzahl: 2970 min<sup>-1</sup>

Betriebsart: S1

Verhältnis I<sub>N</sub>/I<sub>N</sub>: 6,4

Wärmeklasse: B oder F

Neben den oben angegebenen Spannungen sind auch dazwischenliegende Werte zulässig. Die zugehörigen Ströme sind im reziproken Verhältnis der Spannungen umzurechnen. Gegenüber den Bemessungswerten darf die Netzspannung bis zu ± 5 % und die Netzfrequenz bis zu ± 2 % entsprechend dem Bereich A nach IEC 34-1 schwanken.

Temperaturüberwachung

Für die Auswahl einer stromabhängig verzögerten Schutzeinrichtung wurden die Zeiten t<sub>e</sub> wie folgt bestimmt:

Temperaturklasse: T1 T2 T3

Zeit t<sub>e</sub>: 29 29 15 s

Prüfbericht  
PTB Ex 98-30034

Zertifizierungsstelle Explosionsschutz  
Im Auftrag  
Dr.-Ing. U. Engel  
Regierungsdirektor

Braunschweig, 04. Februar 1999

Blatt 1/1

Original: German

Translation

Physikalisch-Technische Bundesanstalt  
Braunschweig und Berlin

PTB

Datasheet .. to EC-TYPE-EXAMINATION CERTIFICATE PTB .. ATEX ....

for the three-phase induction motor of the type E... ..

Ratings

This certificate is valid for the following designs providing the motors of this type differ only negligibly from the sample tested as regards the electrical and thermal stresses:

Power: kW

Voltage: V

Current: A

Power factor:

Frequency: Hz

Speed: min<sup>-1</sup>

Duty Type:

I<sub>N</sub> / I<sub>N</sub> ratio:

Thermal class: B or F

In addition to the above-mentioned voltages, intermediate values are also permissible. The associated currents are to be converted in the inverse ratio to the voltages. The mains voltage may vary by up to ± 5% and the mains frequency by up to ± 2% from the rated values, in keeping with range A according to IEC 34-1.

Temperature monitoring

For the selection of a current-dependent time-lag protective device, the times t<sub>e</sub> were determined as follows:

Temperature class: T1 T2 T3 T4

Time t<sub>e</sub>: s

Test report  
PTB Ex 99-30...

Certification Body Explosion Proofness  
By order  
Dr.-Ing. U. Engel  
Regierungsdirektor

Braunschweig,

Page 1/1

## Explanation of protection types

### Protection type 'Flameproof Enclosure' "d"

#### Protection type 'Flameproof Enclosure' "d"

Explosion-proof three-phase motors in protection type "Flameproof Enclosure" comply with the European Standards EN 50014, EN 50018 and EN 50019.



Motors of this protection type will be delivered as standard for the temperature classes T1-T4 up to frame size 315 for group IIC. Motors in protection type "d" are designed in a way that the explosion of an ignitable mixture inside the motor frame does not penetrate outside (spark ignition-proof). They withstand the explosion pressure. Single-speed motors can on request also be delivered according

to the technical requirements of the VIK (Verband der Industriellen Energie- und Kraftwirtschaft e.V. – Committee of the Industrial Power and Power Utilities).

Standard certificates of conformity for three-phase motors in protection type "d" and for temperature class T4 include the following: Different voltages, speeds, frequencies and number of poles, also pole-changing motors, ambient temperatures from -20°C to +60°C. Installation altitudes even higher than 1000m above sea level, various duty types, motors with temperature detectors as an additional or sole motor protection,

frequency inverter-fed motors. For temperature classes T5 and T6 certificates of conformity are only issued if design and rated data of a motor type are laid down.

Identification according to the EC Directive:

 II 2 G EEx de IIC  
 II 2 G EEx d IIC

#### Certificate:

EC-type-examination certificate by an authority as designated.

#### Example: EC-type-examination certificate

Original: German

Translation

Physikalisch-Technische Bundesanstalt  
Braunschweig und Berlin

PTB

#### (1) EC-TYPE-EXAMINATION CERTIFICATE (Translation)

(2) Apparatus and protective systems for the specified use in hazardous areas – Directive 94/9/EC

(3) EC-type-examination Certificate Number

PTB 02 ATEX 1003



(4) Equipment: Three-phase motor types D...132...

(5) Manufacturer: Loher GmbH

(6) Address: Hans-Loher-Str. 32, 94099 Ruhstorf, Germany

(7) This equipment and any acceptable variation thereof are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 02-11043.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014:1997 + A1 + A2 EN 50018:2000 EN 50019:2000

(10) If the sign „X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II 2 G EEx d IIC T3...T6 resp. EEx de IIC T3...T6

Zertifizierungsstelle Explosionsschutz  
By order:

Braunschweig, April 22, 2002

Dr.-Ing. U. Klausmeyer  
Regierungsdirektor

Page 1/2

Original: German

Translation

Physikalisch-Technische Bundesanstalt  
Braunschweig und Berlin

PTB

#### (13) SCHEDULE

(14) EC-TYPE-EXAMINATION CERTIFICATE PTB 02 ATEX 1003

(15) Description of the apparatus

The apparatus is a rotating electrical machine in protection type flameproof enclosure „d" for the motor part or in protection type flameproof enclosure „d" or increased safety „e" for the terminal box. The motor can optionally also be equipped with a separately certified direct cable entry. In this case the motor can also be operated without terminal box. The flameproof housing is a cast construction which is sealed with an end shield on both sides. The shaft is supported in anti-friction bearings and forms the shaft gap with the end shields on the DE and NDE.

The electrical data of the motor incl. the specifications to comply with the temperature class are fixed in a data sheet to this EC prototype test certificate.

Max. admissible range of ambient temperatures -55 °C/67 °F to 60 °C/160 °F. This range can be limited by the terminal boxes selected or by the data sheet on the electrical designs.

(16) Test Report PTB Ex 02-11043

(17) Special conditions

None;

Additional directions for safe operation:

For mounting and attachment of components (terminal boxes, entries, cable entries, connection parts) only such components are allowed which technically comply as a minimum to the standard mentioned on the cover sheet and are provided with a separate certificate. Special conditions of the components have to be observed and if required the components have also to be type-tested.

If the motor is cooled with a separately driven fan care must be taken that it can only be operated when the separately driven fan is switched on.

(18) Essential health and safety requirements

met by standards

Zertifizierungsstelle Explosionsschutz  
By order:

Braunschweig, April 22, 2002

Dr.-Ing. U. Klausmeyer  
Regierungsdirektor

Page 2/2

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## Explanation of protection types

### Protection type 'Flameproof Enclosure' "d"

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#### Example: Datasheet EC-type-examination certificate

Original: German

Translation

**Physikalisch-Technische Bundesanstalt** **PTB**  
**Braunschweig und Berlin**

**Data sheet 01 to EC-TYPE-EXAMINATION CERTIFICATE PTB 02 ATEX 1003**

**from Loher GmbH, 94099 Ruhstorf, Germany**

for three-phase motor type D...-132...-

Limitation of the electrical data

The motors of this type range are made for the rated data up to the following values:

Power:	15	kW
Voltage:	1000	V
Current:	55	A
Speed:	6000	min <sup>-1</sup>
Duty type:	S1 – S7, S9	

For all motor designs the compliance of the applicable specifications are to be certified by a type test. The "Instruction sheet for electrical design and testing of motors in protection type flameproof enclosure within the scope of the EC prototype test certificate" has to be observed.

The motors are only allowed to be operated in the duty type and under the ambient conditions for which these were type-tested. This includes the operation on the frequency inverter.

Zertifizierungsstelle Explosionsschutz  
By order:

Braunschweig, April 22, 2002

Dr.-Ing. U. Klausmeyer  
Regierungsdirektor

Page 1/1

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## Dust explosion protection

### Dust explosion protection

Dust explosion-proof three-phase motors comply with the European Standards EN 50281-1-1/1-2.

Hazardous areas can exist both in the industry and agriculture. For a specific ambience (zone) only a product (device or motor) of an intended device group and category is allowed to be used (see assignment of device classification to zones). An essential feature of the dust protection is the IP enclosure. Depending on the ambient conditions different requirements have

to be met for a dust-proof housing.

For the dust protection it is important to limit the surface temperature of the motors to a value below the ignition or glow temperature of the combustible dust.

Surface temperature of the motors is  $< 2/3$  of the ignition temperature of a dust-air mixture.

Surface temperature of the motors  $<$  glow temperature (at a 5 mm thick dust layer)  $-75$  K.

The user determines the category and the maximum admissible surface temperature due to the hazardous area and the dust type.

Note: Conductive and non-conductive dust changes the device category (see table: assignment of device classification and enclosure to zones).

The motors are designed for ambient temperatures between  $-20^{\circ}\text{C}$  up to  $+40^{\circ}\text{C}$ .

### Dust explosion protection EN 50281-1-1 / EN 50281-1-2

Device group	II		
Category	2 D	2 D	3 D
Zone	21	22	22
Dust	all types	conductive	non-conductive
Existence of an explosive dust atmosphere	occasionally	rarely or for a short time	
Enclosure	IP 65	IP 65	IP 55
Temperature class	Housing temperature max. $120^{\circ}\text{C}$		
Certification	EG-Examination Certificate BVS 03 ATEX E 259		EG-Declaration of Conformity of the manufacturer
Marking	II 2 D T $120^{\circ}\text{C}$		II 3 D T $120^{\circ}\text{C}$

## Dust explosion protection

### Available versions for dust explosion protection

Dust explosion protection	Operation	Type series Ex-protection gases a. vapours	AM.A without	AM.K Zone 2 EEx nA II	EM.V Zone 1 EEx e II	DN.W Zone 1 EEx de IIC
Category 2 D  Zone 21 and Zone 22 with conductive dust  Enclosure IP65	Mains operation	Marking	Offer Type AM.K II 3 G EEx nA II + II 2 D	II 3 G EEx nA II + II 2 D	II 2 G EEx e II + II 2 D	II 2 G EEx de IIC + II 2 D
		Test		Type test	Type test	Type test if no comparable measurement exists
		Certification		EC-Type-Examination Certificate	EC-Type-Examination Certificate	EC-Type-Examination Certificate
	Inverter operat.	Marking	II 2 D	II 3 G EEx nA II + II 3 D	Offer II 2 G EEx de IIC + II 2 D Type DN.W	II 2 G EEx de IIC + II 2 D
		Test	Type test	Type test with original inverter		Type test
		Certification	EC-Type-Examination Certificate	EC-Type-Examination Certificate		EC-Type-Examination Certificate
Category 3 D  Zone 22  Enclosure IP55	Mains operat.	Marking Test Certification	Offer Type AM.K II 3 G EEx nA II + II 3 D	II 3 G EEx nA II + II 3 D	II 2 G EEx e II + II 3 D	Offer Type DN.W II 2 G EEx de IIC + II 2 D
				Type test	Type test	
				EC-Declaration of Conformity of the manufacturer	EC-Type-Examination Certificate	
	Inverter operat.	Marking Test Certification	II 3 D	II 3 G EEx nA II + II 3 D	Offer Type DN.W II 2 G EEx de IIC + II 2 D	Offer Type DN.W II 2 G EEx de IIC + II 2 D
			Type test	Type test with original inverter		
			EC-Declaration of Conformity of the manufacturer	EC-Declaration of Conformity of the manufacturer		

Applicable to EEx-motors  
CT > 40°C

### Marking of the motor:

e.g. **CE 0102**  **II 2 D T 120°C** on an additional plate  
**IP 65** on the rating plate

The cable glands will only be delivered if requested by a special order. The operating company is responsible that cable glands certified according to the Directive 94/9/EC are used.

**See**  
**EC-Type-Examination Certificate**  
**or**  
**EC-Declaration of Conformity**

# Series A..., E..., Mechanical construction

Sectional views, frame, cooling system

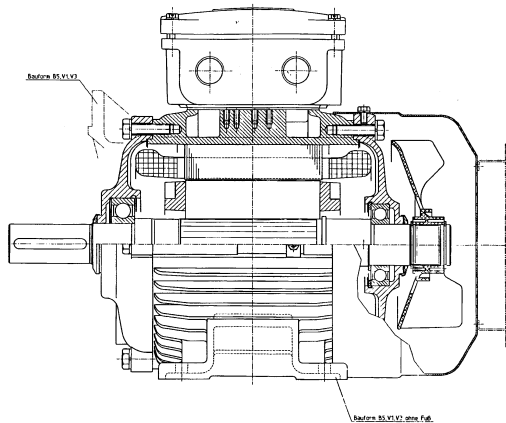
Surface cooling  
A..A without Ex-protection  
A..K Protection type “n”  
E... Protection type EEx e

Water cooling  
A.W. without Ex-protection

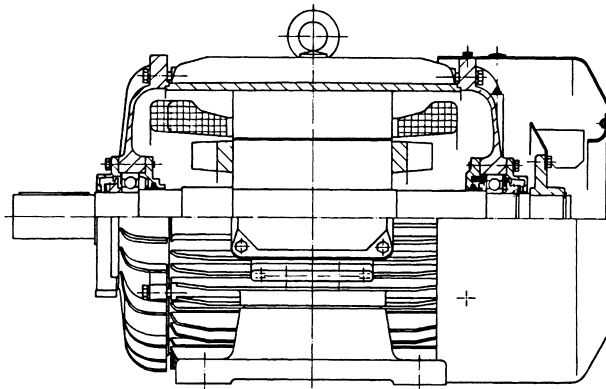
## Sectional views

Surface cooling, cooling systems IC 411,

Type ANGA, A..K, ENG. (up to frame size 200LB),



Type ANGA, A..K, ENG. (from frame size 225MB),  
with regreasing device (from frame size 315)



## Stator frame, ventilation

Frame size from – to	Material	Frame Feet <sup>1</sup>	Surface	End shield Material	Fan cowl Material	Fan <sup>2</sup> Material
90–280	Cast iron	cast-on	with cooling fins	Cast iron	Sheet steel	Plastic <sup>3</sup>
315–355						Steel <sup>4</sup>

<sup>1</sup> For foot-mounting types only.

<sup>2</sup> Suitable for both directions of rotation, however frame sizes 355 2- and 4-pole, only for one direction of rotation.

<sup>3</sup> For special operating conditions we can also supply external fans made of steel for the frame sizes 090-280. This applies especially to high coolant temperatures and increased switching frequency.

<sup>4</sup> Frame size 315 2-pole: Plastic



## Bearings

### Blocking of bearings

#### Antifriction bearings available

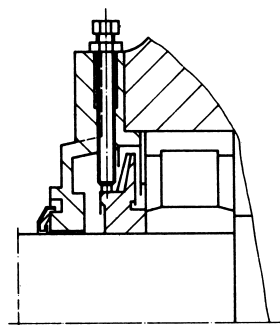
#### Bearings

The motors have deep-groove ball bearings at the DE-side and NDE-side. For special designs with reinforced bearings there is partly a cylindrical roller bearing arranged at the driving end side.

For the assignment and the designation of the bearings see the table below. If special greases are used the motors of frame sizes 090-200, which normally have 2 Z-bearings are provided with Z-bearings.

#### Blocking of bearings

Cylindrical roller bearings are sensitive to vibrations during motor standstill. Vibrations occur not only in transit but also at the mounting location due to the influence of other machines. As a result, lengthwise scoring will appear on the inner ring of the roller bearing. In order to avoid this, all motors with roller bearings are equipped with a special blocking system. The rotor shaft is completely blocked by tightening several hexagon bolts, so that vibrations are no longer transmitted to the bearing surface. When the motor is put into service the counter nuts should be loosened, the bolts unscrewed a few threads and the nuts tightened again. This will loosen the blocking system and the shaft can rotate freely in the bearings.



#### Antifriction bearings available

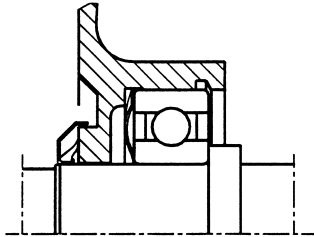
Frame size	No. of poles	Driving-end bearing		Non-driving end bearing	
		Mounting IM B3, IM B5 <sup>1</sup>	Vertical mounting types	Mounting IM B3, IM B5 <sup>1</sup>	Vertical mounting types
090	2– 8	6205-2ZC3	6205-2ZC3	6205-2ZC3	6205-2ZC3
100	2–12	6206-2ZC3	6206-2ZC3	6205-2ZC3	6205-2ZC3
112	2–12	6306-2ZC3	6306-2ZC3	6206-2ZC3	6206-2ZC3
132	2–12	6308-2ZC3	6308-2ZC3	6208-2ZC3	6208-2ZC3
160	2–12	6309-2ZC3	6309-2ZC3	6210-2ZC3	6210-2ZC3
180	2–12	6310-2ZC3	6310-2ZC3	6210-2ZC3	6210-2ZC3
200	2–12	6212-2ZC3	6212-2ZC3	6212-2ZC3	6212-2ZC3
225	2	6213C3	6213C3	6213C3	6213C3*
225	4–12	6213C3	6213C3	6213C3	6213C3
250	2	6215C3	6215C3	6215C3	6215C3*
250	4–12	6215C3	6215C3	6215C3	6215C3
280	2	6217C3	6217C3	6217C3	6217C3*
280	4–12	6217C3	6217C3	6217C3	6217C3
315	2	6316C3	6316C3*	6316C3	6316C3*
315	4–12	6219C3	6219C3	6219C3	6219C3
355	2	6316C3	6316C3*	6316C3	6316C3*
355	4–12	6320C3	6320C3	6320C3	6320C3

<sup>1</sup> Mounting IM B 5; only frame sizes 090–315 M

\* C4-bearing for 60 Hz service

## Arrangement of bearings

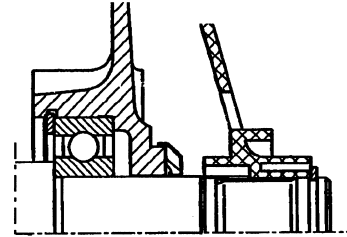
Driving-end bearing



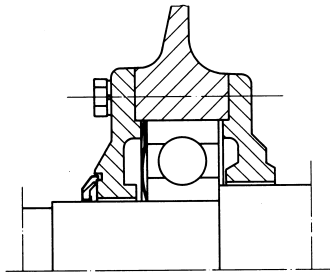
### Frame sizes 090–200

For frame sizes 090–132 a Seeger ring is provided in the bearing hub at the non-driving end (fixed bearing). For frame sizes 160 to 200 a Seeger ring is provided in the bearing hub and another one on the shaft at the non-driving end (fixed bearing).

Non-driving end bearing

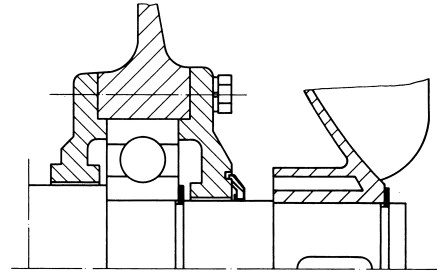


Driving-end bearing

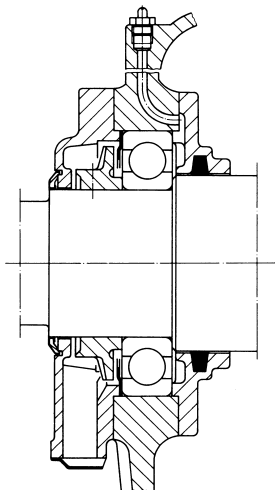


### Frame sizes 225–280

Non-driving end bearing

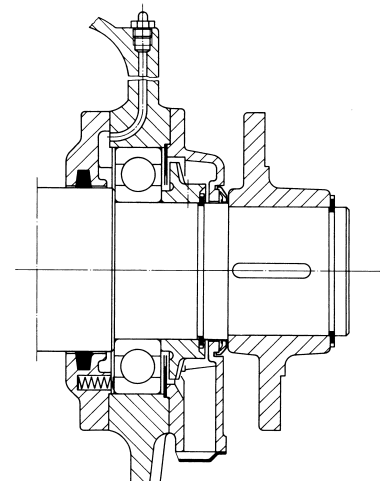


Driving-end bearing



### Frame size 315 and 355M/LB

Non-driving end bearing



Drawing for information purposes only.

### Greasing, regreasing device, grease regulation

All the bearings from frame size 090 to 280 have permanent lubrication. According to experience the filled-in grease will be sufficient for several years.

The bearings from frame size 315 are fitted with a regreasing and grease regulation which can be used during operation without any risk of overfilling. The grease regulation is based on the centrifugal effect of the ring fixed in front of the bearing and forming at the same time a labyrinth towards the outside, providing a satisfactory sealing. The grease filled in the bearings at our factory is sufficient for a certain number of operating hours. Relubrication intervals and quantities depend on the motor speed, the operating conditions and the size of the bearings. In the case of unfavourable operating conditions, e.g. increased ambient

temperature, very dusty or corrosive atmosphere, outdoor installation, the periods reduce by about 30%. The standard periods are indicated in the below table. Near the grease nipple of each motor there is also a special instruction plate stating the sort of grease used and the regreasing frequency and quantities. As a general principle a lithium-based grease with a melting point above 180°C and suitable for a coolant temperature of -30°C up to +60°C is used for bearing lubrication. Regreasing or replacement of the grease is only allowed with a grease quality of the same kind (same saponification component or consistency). In case of special operating conditions, e.g. extremely low or high ambient temperatures, special lubricants are used. These are also stated on the instruction plates

mentioned above. On customer request the motors of the frame sizes 160 to 280 can be supplied with a regreasing device.

The operational life of a motor essentially depends on the life of the bearings. This one, however, is influenced by both the fatigue period of the bearings themselves and the efficiency and life of the lubricant. These two factors should be carefully considered. The present quality of antifriction bearing greases allows permanent lubrication for motors up to frame size 280. Consequently the bearing design becomes simpler and the motor maintenance-free. Thus bearing damage due to maintenance mistakes such as exceeding the regreasing period or using the wrong type of grease can be avoided.

### Grease life, grease quantity and relubrication intervals

Frame size	Grease life with permanent lubrication or relubrication interval with regreasing device in service hours at rated speed						Grease quantity in grammes per bearing	
	Horizontal mounting (B)			Vertical mounting (V)			Permanent lubrication	Relubrication
	3000 min <sup>-1</sup>	1500 min <sup>-1</sup>	≤ 1000 min <sup>-1</sup>	3000 min <sup>-1</sup>	1500 min <sup>-1</sup>	≤ 1000 min <sup>-1</sup>	Grease filling	
90				24000			11	—
100	33000				33000		15	—
112						33000	25	—
132				17000			50	—
160	24000	33000	33000		24000		70	—
180							80	—
200				12000			60	—
225							70	—
250	17000				17000	24000	90	—
280		24000		9000			120	—
315	4000	—	—	2800	—	—	—	35
315	—	8000	11000	—	5600	8000	—	35
355	4000	—	—	2800	—	—	—	35
355	—	8000	11000	—	4000	5600	—	35

The indicated grease life or relubrication intervals are applicable for an ambient temperature of max. 40°C. For every 10°C temperature rise, the lubrication interval is to be reduced by factor 0.7 of the value shown in the table (max. 20°C = factor 0.5).

**Twice the grease life can be expected at an ambient temperature of ≤25°C, however, 33 000 h at a maximum. Intervals for operation of a 60 Hz power supply on request.**

**In case of pure coupling operation the calculated useful bearing life  $L_{10h}$  is more than 50 000 hours. Grease life and relubrication intervals must be observed.**

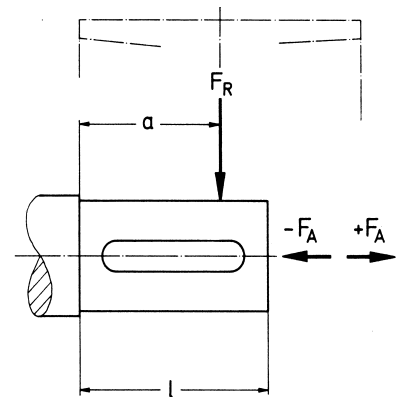
## Permissible forces at shaft end

### Permissible forces at shaft end

Figures are valid for bearings and driving shaft ends in this technical list. They have been based on a

calculated useful life of  $L_{10h} = 20\,000$  hours and are permissible for horizontal and vertical shafts.

Application point at centre of pulley



### Permissible radial force:

a / l Speed min <sup>-1</sup>	a = 0				a = 0.5				a = l			
	3000	1500	1000	750	3000	1500	1000	750	3000	1500	1000	750
Frame size	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
90	0.77	0.97	1.12	1.24	0.70	0.88	1.01	1.12	0.62	0.78	0.90	0.99
100	1.10	1.50	1.70	1.84	1.03	1.15	1.25	1.32	0.95	0.79	0.80	0.80
112	1.60	2.10	2.40	2.65	1.50	1.90	2.20	2.30	1.35	1.50	1.55	1.55
132	2.40	3.00	3.50	3.80	2.15	2.75	3.20	3.50	1.90	2.50	2.90	2.90
160	2.90	3.70	4.30	4.75	2.60	3.30	3.90	4.00	2.30	3.00	2.70	2.70
180	3.25	4.30	5.20	5.65	3.00	4.00	4.80	5.30	2.70	3.70	3.80	3.80
200	2.50	3.20	3.75	4.20	2.25	2.90	3.45	3.85	2.10	2.70	3.20	3.60
225	3.10	4.00	4.70	5.20	2.90	3.70	4.50	4.90	2.60	3.40	4.20	4.60
250	3.30	4.25	5.00	5.70	3.00	4.00	4.70	5.35	2.75	3.70	4.40	5.10
280	4.30	5.50	6.30	7.20	4.00	5.10	5.80	7.00	3.70	4.80	5.40	6.75
315	6.10	6.60	7.80	8.75	5.60	5.95	6.80	7.60	5.20	5.30	5.80	6.00
355	5.60	10.20	11.80	13.20	5.20	9.45	10.80	12.00	4.80	8.50	9.60	10.60

### Permissible axial force:

The following values are permissible for pure axial load. The corresponding bearings are specified in this technical list and calculations

are based on a fatigue life of  $L_{10h} = 20\,000$  hours. The below indicated values are valid for a 50 Hz power supply. For operating

at 60 Hz the values have to be reduced by 6 % in order to achieve the same service life.

Design Speed min <sup>-1</sup>	Horizontal shaft				Vertical shaft – upthrust				Vertical shaft – downthrust			
	3000	1500	1000	750	3000	1500	1000	750	3000	1500	1000	750
Frame size +F <sub>A</sub> or -F <sub>A</sub>	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
90	0.68	0.91	1.10	1.25	0.72	0.96	1.15	1.30	0.65	0.88	1.10	1.20
100	0.67	0.91	1.10	1.20	0.75	1.00	1.15	1.30	0.62	0.84	1.10	1.15
112	0.90	1.20	1.40	1.60	0.99	1.35	1.55	1.75	0.85	1.10	1.35	1.55
132	1.30	1.75	2.10	2.40	1.45	1.90	2.30	2.60	1.20	1.65	1.90	2.20
160	1.60	2.10	2.50	2.90	1.90	2.50	3.00	3.30	1.40	1.90	2.20	2.60
180	1.60	2.10	2.50	2.90	2.00	2.60	3.00	3.40	1.30	1.70	2.20	2.50
200	2.00	2.70	3.20	3.60	2.70	3.50	4.10	4.50	1.50	2.20	2.60	3.10
225	2.60	3.45	4.05	4.60	3.40	4.45	5.20	5.70	2.05	2.80	3.30	3.90
250	2.70	3.20	3.75	4.30	3.80	4.65	5.30	5.80	2.00	2.25	2.75	3.30
280	3.40	4.40	5.30	6.10	4.70	6.20	7.20	7.90	2.40	3.20	3.90	4.80
315 S	5.00	5.90	7.00	7.90	7.60	8.40	9.50	10.40	3.30	4.30	5.40	6.30
315 MB	5.00	5.80	6.90	7.60	7.70	8.60	9.70	11.40	3.10	3.90	5.00	5.00
315 MC, MD	4.90	5.60	6.50	7.40	8.00	9.40	10.80	11.70	2.80	3.10	3.60	4.50
315 L	4.80	5.30	5.90	6.90	8.40	10.00	10.90	11.70	2.40	2.15	2.60	3.60
355 M	4.70	8.80	10.30	11.60	8.80	14.50	17.00	18.50	1.95	4.70	5.70	7.10
355 LB	4.60	8.50	10.00	11.40	9.40	15.00	18.00	19.50	1.25	3.80	4.60	6.10

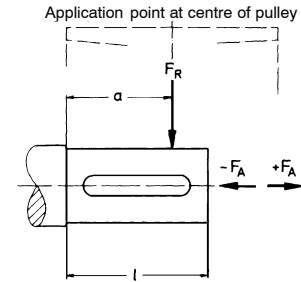
1 kN (Kilonewton) ≈ 100 kp

## Additional axial force with radial load at shaft end

### Additional axial force with radial load at shaft end

If the shaft ends are loaded at  $a = l$  with the permissible radial force  $F_R$  applicable in each case, the following additional forces are allowed to occur in axial direction.

If the permissible radial force is not fully utilized, higher loads are possible in axial direction.  
(Values on request)



Design Speed min <sup>-1</sup>	3000	Horizontal shaft				3000	Vertical shaft – upthrust				3000	Vertical shaft – downthrust			
		1500	1000	750			1500	1000	750			1500	1000	750	
Frame size	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
<b>+F<sub>A</sub></b>						Shaft end upwards Mounting arrangements IM V3, IM V6, IM V14, IM V19, IM V36					Shaft end downwards Mounting arrangements IM V1, IM V5, IM V10, IM V18, IM V15				
90	0.33	0.43	0.53	0.58	0.36	0.48	0.57	0.63		0.29	0.40	0.50	0.55		
100	0.30	0.40	0.51	0.65	0.30	0.48	0.60	0.75		0.25	0.35	0.45	0.58		
<b>-F<sub>A</sub></b>						Shaft end downwards Mounting arrangements IM V1, IM V5, IM V10, IM V18, IM V15					Shaft end upwards Mounting arrangements IM V3, IM V6, IM V14, IM V19, IM V36				
90	0.56	0.75	0.90	1.00	0.60	0.80	0.95	1.05		0.53	0.71	0.87	0.95		
100	0.50	0.70	0.85	1.00	0.57	0.80	0.95	1.10		0.44	0.63	0.78	0.93		
<b>+F<sub>A</sub> or -F<sub>A</sub></b>															
112	0.67	0.90	1.10	1.30	0.75	1.05	1.25	1.40		0.60	0.80	1.05	1.20		
132	0.97	1.20	1.50	1.70	1.10	1.40	1.70	2.00		0.89	1.10	1.30	1.60		
160	1.20	1.50	1.80	2.20	1.50	1.90	2.30	2.60		1.00	1.20	1.50	1.80		
180	1.10	1.40	1.70	2.00	1.50	1.90	2.20	2.60		0.85	1.00	1.30	1.60		
200	1.70	2.20	2.60	2.90	2.40	3.00	3.50	3.70		1.20	1.70	2.00	2.30		
225	2.20	2.70	2.95	3.50	3.05	3.70	4.10	4.55		1.65	2.10	2.20	2.80		
250	2.30	2.50	2.70	2.90	3.35	3.90	4.20	4.50		1.55	1.50	1.70	1.90		
280	2.90	3.70	4.30	4.30	4.20	5.30	6.30	6.40		2.00	2.40	3.30	3.50		
315 S	2.60	3.10	3.70	4.40	5.10	5.50	6.20	6.80		0.80	1.40	2.10	2.70		
315 MB	2.50	3.00	3.60	4.10	5.20	5.80	6.40	7.80		0.60	1.10	1.60	1.50		
315 MC, MD	2.40	2.90	3.30	3.90	5.50	6.50	7.30	8.00			on request				
315 L	2.40	2.50	2.40	3.10	6.00	7.10	7.40	7.90			on request				
355 M	2.70	4.60	5.60	6.30	6.50	10.50	12.00	13.00			on request				
355 L	2.50	4.50	5.50	6.00	7.20	11.00	13.00	13.50			on request				

## Reinforced bearings

Design with cylindrical roller bearing at the driving-end side for higher radial load (e.g. belt drive). Bearings of the motors from frame size 160 to 200 have permanent lubrication. From frame size 225 the motors are equipped with regreasing device on the DE-side as well as on the NDE-side.

## Antifriction bearings available

Frame size	No. of poles	Driving-end bearing		Non-driving end bearing	
		Mounting IM B 3, IM B 5 <sup>1</sup>	Vertical mounting types	Mounting IM B 3, IM B 5 <sup>1</sup>	Vertical mounting types
160	2	NU 309E	NU 309E	6210-2Z C3	6210-2Z C3
180	2	NU 310E	NU 310E	6210-2Z C3	6210-2Z C3
200	2	NU 212E C3	NU 212E C3	6212-2Z C3	6212-2Z C3
200	4–12	NU 212E	NU 212E	6212-2Z C3	6212-2Z C3
225	2	NU 213E C3	NU 213E C3	6213 C3	6213 C3*
225	4–12	NU 213E	NU 213E	6213 C3	6213 C3
250	2	NU 215E C3	NU 215E C3	6215 C3	6215 C3*
250	4–12	NU 215E	NU 215E	6215 C3	6215 C3
280	2	NU 217E C3	NU 217E C3	6217 C3	6217 C3*
280	4–12	NU 217E	NU 217E	6217 C3	6217 C3
315	2	NU 316E C3	NU 316E C3	6316 C3	6316 C3*
315	4	NU 219E C3	NU 219E	6219 C3	6219 C3
315	6–12	NU 219E	NU 219E	6219 C3	6219 C3
355	2	NU 316E C3**	NU 316E C3**	6316 C3	6316 C3*
355	4	NU 320E C3	NU 320E	6320 C3	6320 C3
355	6–12	NU 320E	NU 320E	6320 C3	6320 C3

<sup>1</sup> Mounting IM B 5; Frame sizes 160–315 M

\* C4-bearing for 60 Hz service

\*\* For 50 Hz service only, for 60 Hz service on request

## Relubrication intervals and grease quantities

Frame size	Grease life with permanent lubrication or relubrication interval with regreasing device in service hours at rated speed			Grease quantity in grammes per bearing	
	3000 min <sup>-1</sup>	1500 min <sup>-1</sup>	1000 to 500 min <sup>-1</sup>	Relubrication	Permanent lubrication
160	24000	—	—	—	25
180	17000	—	—	—	32
200	24000	33000	33000	—	22
225	2800	5600	8000	14	—
250	2800	5600	8000	16	—
280	2000	5600	8000	20	—
315	2000	—	—	35	—
315	—	4000	5600	25	—
355	2000	—	—	35	—
355	—	2800	5600	50	—

The indicated grease life is applicable for an ambient temperature of max. 40°C. For every 15°C temperature rise, the lubrication interval is to be reduced to the half of the value indicated in the table.

For the design with vertical shaft (mounting V) relubrication time is  $\frac{1}{3}$  less.  
For operation at 60 Hz systems the intervals have to be reduced by a  $\frac{1}{4}$ .

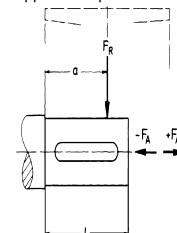
## Reinforced bearings Permissible forces at shaft end

### Weight of rotor

#### Permissible forces at shaft end

The following values have been based on a calculated useful life of  $L_{10h} = 20\,000$  hours. They are permissible for horizontal and vertical shafts.

Application point at centre of pulley



#### Permissible radial force:

a / l Speed min <sup>-1</sup>	a = 0				a = 0.5 l				a = l			
	3000	1500	1000	750	3000	1500	1000	750	3000	1500	1000	750
Frame size	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
160	7.50	7.80	6.40	6.30	4.30	4.20	3.30	3.50	2.80	2.70	2.10	2.10
180	10.00	7.80	6.80	7.50	5.70	4.00	3.60	4.10	3.60	2.80	2.20	2.60
200	6.95	8.60	9.90	11.00	6.25	8.00	9.20	9.60	5.80	6.20	6.25	6.30
225	7.90	10.00	11.60	12.60	7.20	9.10	7.50	7.50	6.60	6.90	5.00	5.00
250	9.80	12.00	14.00	15.30	8.90	11.10	9.00	9.00	8.00	9.00	6.00	6.00
280	12.00	15.20	17.00	19.80	9.20	14.80	16.40	10.40	8.10	12.90	11.90	6.80
315 S	14.80	20.00	23.00	25.20	12.00	18.50	23.50	24.00	8.00	14.80	15.00	15.10
315 M	14.50	19.50	23.10	25.00	12.00	16.50	22.00	20.00	8.50	15.00	15.10	13.00
315 L	14.50	19.50	24.00	21.50	12.50	18.50	12.40	9.20	8.10	15.00	8.00	6.00
355	18.00	34.50	39.00	44.00	17.00	28.00	28.50	29.00	11.00	18.50	19.00	19.50

#### Additional axial force with radial load at shaft end

If the shaft ends are loaded at  $a = l$  with the permissible radial force  $F_R$  applicable in each case, the following additional forces are allowed to occur in axial direction. If the permissible radial force is not fully utilized, higher loads are possible in axial direction. (Values on request)

Design Speed min <sup>-1</sup>	Horizontal shaft				Vertical shaft – upthrust				Vertical shaft – downthrust			
	3000	1500	1000	750	3000	1500	1000	750	3000	1500	1000	750
Frame size +F <sub>A</sub> or -F <sub>A</sub>	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
160	1.03	—	—	—	1.37	—	—	—	0.80	—	—	—
180	0.90	—	—	—	1.34	—	—	—	0.60	—	—	—
200	1.20	1.60	2.00	2.30	1.90	2.40	2.80	3.20	0.70	1.00	1.35	1.75
225	1.60	1.90	2.70	3.30	2.40	2.90	3.90	4.40	1.00	1.20	1.90	2.50
250	1.60	2.00	2.90	3.30	2.60	3.40	4.40	4.90	0.80	1.10	1.90	2.40
280	2.20	2.30	3.20	4.40	3.40	3.90	5.00	6.30	1.30	1.05	1.90	3.20
315 S	4.05	3.70	4.40	5.00	6.60	6.10	6.90	7.55	2.30	2.05	2.80	3.40
315 MB	4.05	3.60	4.10	5.10	6.80	6.30	6.95	9.00	2.15	1.70	2.20	2.65
315 MC, MD	3.95	3.40	3.60	4.60	7.10	7.10	7.85	8.90	1.80	0.85	0.75	1.80
315 L	4.00	3.10	3.90	5.20	7.60	7.70	8.90	10.00	1.55	0	0.55	2.00
355 M	3.60	6.00	7.00	8.00	7.65	11.90	13.90	14.90	0.80	1.90	2.40	3.40
355 L	3.45	5.60	6.90	7.70	8.30	12.40	15.00	15.60	0.20	0.90	1.50	2.30

The permissible axial forces are the same as for the standard design.

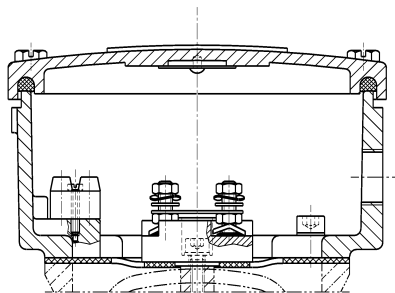
### Weight of rotor

(incl. shaft and fan) approx. kg

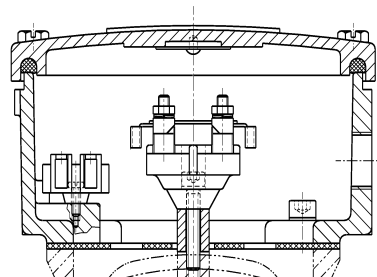
Frame size	3000 min <sup>-1</sup>	1500 min <sup>-1</sup>	1000 min <sup>-1</sup>	750 min <sup>-1</sup>	Frame size	3000 min <sup>-1</sup>	1500 min <sup>-1</sup>	1000 min <sup>-1</sup>	750 min <sup>-1</sup>
90LD	3.8	4.8	4.0	4.0	225 SE	—	85	—	92
100LD	5.6	5.9	7.2	8.1	ME	76	96	105	105
112 MB	8.3	12.1	11.0	11.0	250 ME	101	135	144	145
132 SB	12	15	19	19	280 SG	110	147	168	168
SD	13	—	—	—	MG	124	167	191	191
MB	—	19	19	24	315 SB	234	231	236	236
MD	—	—	24	—	MB	251	260	273	346
160 MB	24	31	35	32	MC	—	—	427	386
MD	27	—	—	35	MD	283	344	427	386
LB	32	38	44	47	LB	324	422	491	434
180 MB	40	49	—	—	355 MB	365	520	600	620
LB	—	53	48	57	LB	420	600	700	720
200 LG	64	73	81	80					
LJ	67	—	81	—					

## Terminal box

### Basic layouts

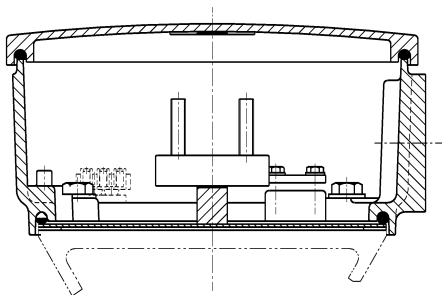


**Type: ANGA**  
**Frame sizes 090–225**

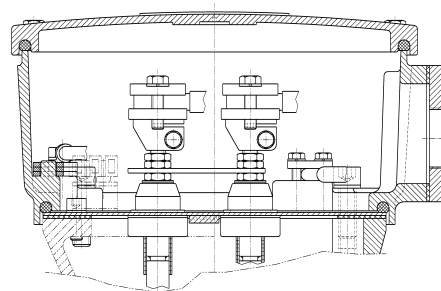


**Type: A..K / E...**  
**Frame sizes 090–225**

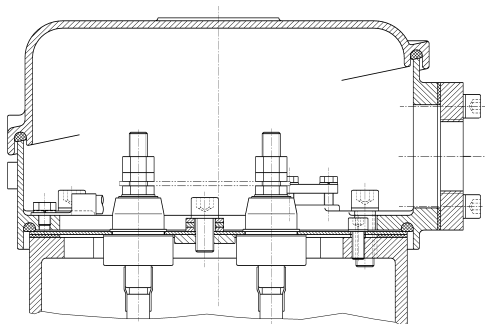
For frame sizes 090–100 the terminal board is mounted into the base of the terminal box.



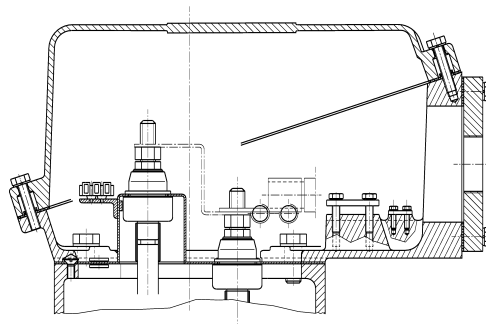
**Type: ANGA**  
**Frame size 250**



**Type: A..K / E...**  
**Frame size 250**



**Type: ANGA**  
**Frame sizes 280–315M**



**Type: A..K / E...**  
**Frame sizes 315L–355**

In motors of the type series A..K and E the connection bolts are fitted with round terminals to DIN 46223.

### Terminal box dimensions

**M 143666**

(Also see table of dimension drawings)



## Terminal box

### Terminal box, Type ANGA (without Ex-protection)

Enclosure: IP 55

Housing material: Cast iron

Frame size	Standard version with 6 terminals				Max. possible number of terminals				Additional terminal box Number of terminals x cross section
	Terminal stud	Amperage per terminal <sup>3</sup>	Additional terminals in main terminal box max. number x cross section	Max. conductor diameter	Number of terminals	Terminal stud	Amperage per terminal	Additional terminals in main terminal box max. number x cross section	
		[A]	[mm <sup>2</sup> ] <sup>1</sup>	[mm <sup>2</sup> ]			[A]	[mm <sup>2</sup> ] <sup>1</sup>	[mm <sup>2</sup> ] <sup>1</sup>
90	M 4	16	2 x 2.5	4 6 <sup>2</sup>	—	—	—	—	4 x 2.5
100	M 4	16	2 x 2.5	4 6 <sup>2</sup>	—	—	—	—	4 x 2.5
112	M 5	25	4 x 2.5	4 6 <sup>2</sup>	—	—	—	—	4 x 2.5
132	M 6	63	4 x 2.5	25	—	—	—	—	4 x 2.5
160	M 6	63	4 x 2.5	25	—	—	—	—	4 x 2.5
180	M 8	100	4 x 2.5	25	9	M 8	100	4 x 2.5	4 x 2.5
200	M 8	100	4 x 2.5	25	9	M 8	100	4 x 2.5	4 x 2.5
225	M 10	160	4 x 2.5	25	9	M 8	100	4 x 2.5	4 x 2.5
250	M 10	160	4 x 2.5	35	9	M 8	100	4 x 2.5	4 x 2.5
280	M 10	250	6 x 2.5	50	9	M 12	250	4 x 2.5	10 x 2.5
315 S, M	M 12	250	6 x 2.5	50	9	M 12	250	4 x 2.5	10 x 2.5
315 L	M 16	315	6 x 2.5	150	9	M 12	250	4 x 2.5	10 x 2.5
355	M 16	315	6 x 2.5	150	9	M 12	250	4 x 2.5	10 x 2.5

<sup>1</sup> Rated voltage 420V

<sup>2</sup> Max. cross section with cable lug

<sup>3</sup> The cross section [mm<sup>2</sup>] depends on the cable lug applied under consideration of the air gaps.

Number and size of the entry threads see dimension drawing.

Cable glands (on special order) see below table.

### Cable glands, Type ANGA (without Ex-protection)

For delivery the entry threads are sealed with a plug.

Only on special order the terminal boxes are delivered with cable gland according to the table.

Special glands on request.

Frame size	Standard cable glands		Max. entry threads <sup>3</sup>		
	Entry thread <sup>1</sup>	Type HSK-K <sup>2</sup> Cable diameter [mm]	Number	metric	NPT <sup>4</sup>
090	1 x M 25 x 1.5	9 – 16	1	M 25 x 1.5	3/4 "
100	1 x M 32 x 1.5	13 – 20	1	M 32 x 1.5	1 "
112	2 x M 32 x 1.5	13 – 20	2	M 32 x 1.5	1 "
132	2 x M 32 x 1.5	13 – 20	2	M 50 x 1.5	2 "
160	2 x M 40 x 1.5	22 – 32	2	M 50 x 1.5	2 "
180	2 x M 40 x 1.5	22 – 32	2	M 63 x 1.5	2 "
200	2 x M 50 x 1.5	32 – 38	2	M 63 x 1.5	2 "
225	2 x M 50 x 1.5	32 – 38	2	M 63 x 1.5	2 "
250	2 x M 63 x 1.5	37 – 44	2	M 63 x 1.5	2 "
280	2 x M 63 x 1.5	37 – 44	2	M 75 x 1.5	2 1/2 "
315 S, M	2 x M 63 x 1.5	37 – 44	2	M 75 x 1.5	2 1/2 "
315 L	2 x M 63 x 1.5	37 – 44	2	M 100 x 1.5	3 1/2 "
355	2 x M 63 x 1.5	37 – 44	2	M 100 x 1.5	3 1/2 "

Entry threads for PTC thermistors, heating: M20x1.5 D = 6–12 mm

<sup>1</sup> Number and size of entry threads to DIN 42925

<sup>2</sup> Cable glands are suitable for unshielded and non-armoured cables and leads.

<sup>3</sup> Other threads, number and size on request.

<sup>4</sup> Cable glands for NPT-threads not available.

## Terminal box

**Terminal box, Type AMGK and ENG.**  
Enclosure: IP 55  
Protection type: EEx e II to EN 50014/50019  
Housing material: Cast iron

Frame size	Standard version with 6 terminals					Max. possible number of terminals					Additional terminal box
	Terminal stud	Amperage per terminal	Max. cross section	Additional terminals in main terminal box max. number x cross section	Max. conductor diameter	Number of terminals	Terminal stud	Amperage per terminal	Max. cross section	Additional terminals in main terminal box max. number x cross section	Number of terminals x cross section
		[A]	[mm <sup>2</sup> ]	[mm <sup>2</sup> ] <sup>1</sup>	[mm <sup>2</sup> ]			[A]	[mm <sup>2</sup> ]	[mm <sup>2</sup> ] <sup>1</sup>	
90	M 4	22	2.5	6 <sup>2</sup>	2 x 2.5	—	—	—	—	—	4 x 2.5
100	M 4	22	2.5	6 <sup>2</sup>	2 x 2.5	—	—	—	—	—	4 x 2.5
112	M 4	22	2.5	6 <sup>2</sup>	4 x 2.5	—	—	—	—	—	4 x 2.5
132	M 5	52	10	25 <sup>2</sup>	4 x 2.5	—	—	—	—	—	4 x 2.5
160	M 5	52	10	25 <sup>2</sup>	4 x 2.5	—	—	—	—	—	4 x 2.5
180	M 6	70	16	50 <sup>2</sup>	4 x 2.5	12	M 5	52	10	25 <sup>2</sup>	4 x 2.5
200	M 6	70	16	50 <sup>2</sup>	4 x 2.5	12	M 5	52	10	25 <sup>2</sup>	4 x 2.5
225	M 6	70	16	50 <sup>2</sup>	4 x 2.5	12	M 6	70	16	25 <sup>2</sup>	4 x 2.5
250	M 10	160	70	—	4 x 2.5	12	M 6	70	16	25 <sup>2</sup>	4 x 2.5
280	M 10	250	70	—	6 x 2.5	9	M 12	250	150	—	10 x 2.5
315 S, M	M 12	250	150	—	6 x 2.5	9	M 12	250	150	—	10 x 2.5
315 L	M 16	315	300	—	6 x 2.5	9	M 12	250	150	—	10 x 2.5
355	M 16	315	300	—	6 x 2.5	9	M 12	250	150	—	10 x 2.5

<sup>1</sup> Rated voltage 420V

<sup>2</sup> Max. cross section with cable lug

Number and size of the entry threads see dimension drawing.  
Cable glands (on special order) see below table.

## Cable glands, Type AMGK and ENG.

For delivery the entry threads are sealed with a certified plug.

Only on special order the terminal boxes are delivered with cable gland according to the table.

Special glands on request.

The operator is responsible that certified cable glands acc. to Directive 94/9/EC are used.

Frame size	Standard cable glands		Max. entry threads <sup>3</sup>		
	Entry thread <sup>1</sup>	Type HSK-M-Ex <sup>2</sup>	Number	metric	NPT <sup>4</sup>
		Cable diameter [mm]			
090	1 x M 25 x 1.5	10 – 16	1	M 25 x 1.5	3/4 "
100	1 x M 32 x 1.5	13 – 20	1	M 32 x 1.5	1 "
112	2 x M 32 x 1.5	13 – 20	2	M 32 x 1.5	1 "
132	2 x M 32 x 1.5	13 – 20	2	M 50 x 1.5	2 "
160	2 x M 40 x 1.5	22 – 32	2	M 50 x 1.5	2 "
180	2 x M 40 x 1.5	22 – 32	2	M 63 x 1.5	2 "
200	2 x M 50 x 1.5	32 – 38	2	M 63 x 1.5	2 "
225	2 x M 50 x 1.5	32 – 38	2	M 63 x 1.5	2 "
250	2 x M 63 x 1.5	37 – 44	2	M 63 x 1.5	2 "
280	2 x M 63 x 1.5	37 – 44	2	M 75 x 1.5	2 1/2 "
315 S, M	2 x M 63 x 1.5	37 – 44	2	M 75 x 1.5	2 1/2 "
315 L	2 x M 63 x 1.5	37 – 44	2	M 100 x 1.5	3 1/2 "
355	2 x M 63 x 1.5	37 – 44	2	M 100 x 1.5	3 1/2 "

Entry threads for PTC thermistors, heating: M20x1.5 D = 6–12 mm

<sup>1</sup> Number and size of entry threads to DIN 42925

<sup>2</sup> Cable glands are suitable for unshielded and non-armoured cables and leads.

<sup>3</sup> Other threads, number and size on request.

<sup>4</sup> Cable glands for NPT-threads not available.

## Motors with led out cable

## Motors with reverse lock

### Three-phase motors with led out cable

Three-phase motors with led out connecting cable are used in machines or ventilating equipment where due to the narrow space conditions the electrical connection is made via a separately located terminal box.

#### Design:

The motors correspond with the TEFC designs in this technical list, only that instead of the terminal box a bushing plate is fitted. See dimension drawings for frame sizes and mounting types. The loose end of the connection cable

must be indicated in the order, standard length 1.5m. Two or more cable entries are used for pole-changing motors or single-speed motors with a rated current > 70A. Admissible coolant temperature –20°C up to +50°C.

In standard designs the following cable types are used:

Insulation class of the motor	Cable		
	Type	U <sub>N</sub> max	max. temperature at the conductor
F	Öfflex	500V	– 30° C up to + 80° C
F	NSSHöu-J	1000V	– 20° C up to + 90° C
F	EWKF or SIHF	500V	– 50° C up to + 180° C

### Motors with reverse lock

Where reverse running of the switched-off drive must be avoided, the use of three-phase motors equipped with a mechanical reverse lock is possible. Reverse locks are maintenance-free and have separately spring-loaded clamping pieces. The locks of the type KK are delivered with permanent grease filling. The clamping pieces have a tendency to rise.

As regards the locks of the series FXM, which are provided with an oil film to protect them against corrosion, the clamping pieces lift automatically after starting due to the centrifugal force. There will be no wear if the motors are operated at the rated speed. Under no circumstances should the reverse lock be used as a safeguard against wrong direction of rotation due to false connection.

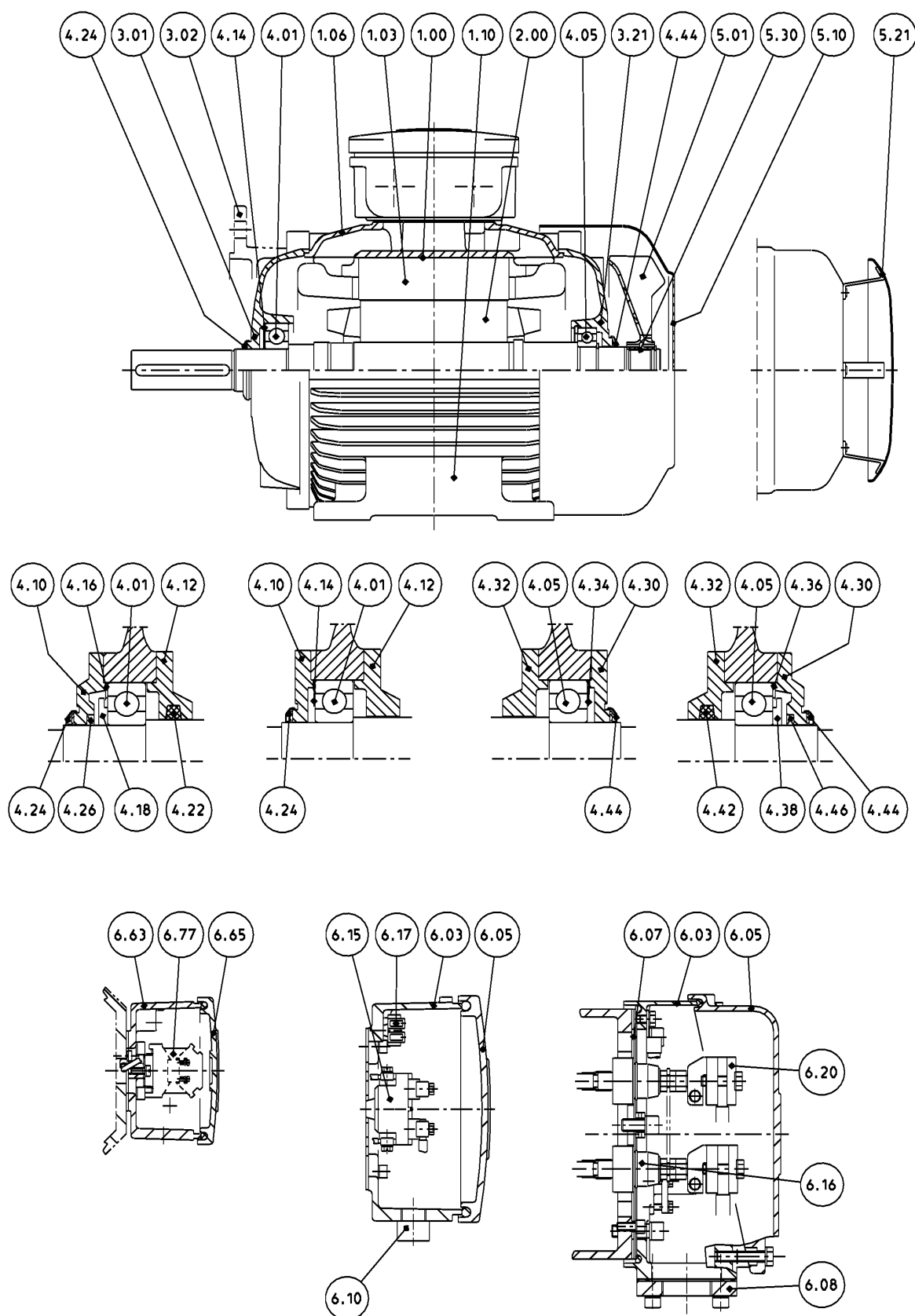
The direction of rotation has to be indicated in the order. The tables in this technical list are valid for the motor outputs. See the table below for the locks to be used for the different frame sizes. The dimensions of frame sizes 90 up to 112 are identical with those of standard motors. Dimension drawings for larger types are available on request.

Motor		Reverse lock	
Frame sizes	No. of poles	Type	M <sub>t</sub> [Nm]
090	2–12	KK 25	68
100	2–12	KK 25	68
112	2–12	KK 30	110
132	2–6	FXM 51–25 DX	680
160	2–6	FXM 66–25 DX	1480
180	2–6	FXM 66–25 DX	1480
200	2–8	FXM 86–25 DX	2410
225	2–8	FXM 86–25 DX	2410
250	2–8	FXM 100–50 DX	6000
280	2–8	FXM 120–50 SX	10400
315	2–8	FXM 120–50 SX	10400
355	2	FXM 120–50 SX	10400
355	4–6	FXM 140–50 SX	15200

M<sub>t</sub> = Rated torque of the reverse lock

### Enclosure

With reverse locks according to the table on the left the motors of the frame sizes 090 up to 355 can be delivered with enclosure IP 55 or IP 56. Higher enclosures on request.



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## Spare parts

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1.00 Stator, complete  
1.03 Stator core with winding  
1.06 Stator housing  
1.10 Mounting feet, unmachined  
(1 pair)  
  
2.00 Rotor, complete (balanced)  
  
3.01 End shield, DE  
3.02 Flange shield, DE  
3.21 End shield, NDE  
  
4.01 Bearing, DE  
4.05 Bearing, NDE  
4.10 Outside bearing cap, DE  
4.12 Inner bearing cap, DE  
4.14 Resilient preloading ring, DE  
4.16 Grease guide disk, DE  
4.18 Centrifugal disk, DE  
4.22 Felt packing ring, DE  
4.24 Outside gasket, DE  
4.26 Inner gasket, DE  
4.30 Outside bearing cap, NDE  
4.32 Inner bearing cap, NDE  
4.34 Resilient preloading ring, NDE

4.36 Grease guide disk, NDE  
4.38 Centrifugal disk, NDE  
4.42 Felt packing ring, NDE  
4.44 Outside gasket, NDE  
4.46 Inner gasket, NDE  
  
5.01 External fan, complete  
5.10 Fan cover, complete  
5.21 Protective cover, complete  
5.30 Spring fastener  
  
6.03 Base of terminal box  
6.05 Terminal box cover  
6.07 Bushing plate  
6.08 Cable gland  
6.10 Cable entry  
6.15 Terminal board, complete  
6.16 Bushing terminal  
6.17 Accessory terminal  
6.20 Clamping  
  
6.63 Base of terminal box  
6.65 Terminal box cover  
6.77 Accessory terminal

The parts shown are available in different sets depending on type, size, mounting and enclosure. They are available from our works. All other parts such as bolts, spring washers etc. are available anywhere.

**When ordering spare parts, please state:**

**Spare part designation**  
**Motor type**  
**Serial number**

**Example:**

<b>3.01 End shield, DE</b> <b>ANGA-200LG-08</b> <b>3 386 388</b>
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## Type series A..., E..., Special designs

Frame size	090	100	112	132	160	180	200	225	250	280	315	355
Mounting types IM B6, IM B7, IM B8, IM B9, IM B15, IM V5, IM V6, IM V8, IM V9	○	○	○	○	○	○	○	○	○	●	●	A
IM B5	●	●	●	●	●	●	●	●	●	●	A	N
IM B35, IM V1, IM V3	●	●	●	●	●	●	●	●	●	●	●	●
IM B34, IM B14, IM V18, IM V19 <sup>1</sup>	●	●	●	A	A	A	A	A	A	A	A	N
Protective cover for IM V1, IM V5, IM V8, IM V10, IM V18 (standard for EEx) , V15	●	●	●	●	●	●	●	●	●	●	●	●
Enclosure IP 56	●	●	●	●	●	●	●	●	●	●	●	●
Radial shaft sealing ring at driving end	●	●	●	●	●	●	●	●	●	●	●	●
Labyrinth ring for external bearing sealing	N	N	N	N	N	N	N	●	●	●	●	●
Fixed bearing at driving end	●	●	●	●	●	●	●	●	●	●	○	○
Fixed bearing at non-driving end	○	○	○	○	○	○	○	○	○	○	●	●
Reinforced bearing (roller bearing at driving end)	N	N	N	N	●	●	●	●	●	●	●	●
Regreasing device	N	N	N	N	●	●	●	●	●	●	○	○
Grease collecting chamber	N	N	N	N	N	A	●	●	●	●	●	●
Flange with tolerance R (reduced) acc. to DIN 42955	●	●	●	●	●	●	●	●	●	●	●	●
Fan with plastic coating <sup>2</sup>	N	N	N	N	N	N	N	N	N	N	●	●
Fan made of brass	●	●	●	●	●	●	●	●	●	●	●	●
Fan made of aluminium alloy	●	●	●	●	●	●	N	N	N	N	N	N
Forced ventilation axial <sup>6</sup>	●	●	●	●	●	●	●	●	●	●	●	●
Second standard shaft end	●	●	●	●	●	●	●	●	●	●	●	●
Non-standard shaft end	●	●	●	●	●	●	●	●	●	●	●	●
Non-standard flange	●	●	●	●	●	●	●	●	●	●	●	●
Vibration level R (reduced) or S (special)	●	●	●	●	●	●	●	●	●	●	●	●
Noise class 3 <sup>4</sup>	N	N	A	●	●	●	●	●	●	●	●	●
Non-standard voltage and/or frequency	●	●	●	●	●	●	●	●	●	●	●	●
Dual voltage design	●	●	●	●	●	●	●	●	●	●	●	●
Insulation class H (not for EEx)	●	●	●	●	●	●	●	●	●	●	●	●
Insulation class C (not for EEx)	A	A	A	A	A	A	A	A	A	A	A	A
Sealing of winding heads	●	●	●	●	●	●	●	●	●	●	●	A
Fully insulated against moisture or acids	●	●	●	●	●	●	●	●	●	●	●	●
Built-in PTC thermistors	●	●	●	●	●	●	●	●	●	●	●	●
Built-in NTC thermistors <sup>5</sup> (not for EEx)	N	N	N	N	N	N	●	●	●	●	●	●
Built-in space heater	●	●	●	●	●	●	●	●	●	●	●	●
SPM-nipples or SPM-detectors installed	N	N	N	●	●	●	●	●	●	●	●	●
Bearing thermometer	N	N	N	N	N	N	N	N	●	●	●	●
Reverse lock	●	●	●	●	●	●	●	●	●	●	●	●
Tachometer	●	●	●	●	●	●	●	●	●	●	●	●
Other colours than RAL 7030	●	●	●	●	●	●	●	●	●	●	●	●
Special painting N08, N14, N14A, Z21, Z05, J08, S10, G04	●	●	●	●	●	●	●	●	●	●	●	●
VIK-design	●	●	●	●	●	●	●	●	●	●	●	●
Dairy design	●	●	●	●	●	●	●	●	●	●	A	A
Design for extremely high or low ambient temperatures	●	●	●	●	●	●	●	●	●	●	●	●

<sup>1</sup> Only up to frame size 112 acc. to DIN 42677.

<sup>2</sup> Frame sizes 090–280 and 315–02: Fan with plastic coating standard.

<sup>4</sup> Noise class 3 not available for all frame sizes and speeds.

<sup>5</sup> Selector inside terminal box necessary for NTC thermistors.

<sup>6</sup> For EEx on request.

A on request

N cannot be supplied

○ no extra charge

● extra charge

# Totally-enclosed fan-cooled, Series A..A, without Ex-protection

## Electrical design

### Electrical design of the series ANGA and AMGA

The motors of the series ANGA and AMGA (totally enclosed fan-cooled, see type code on page 11) are available both in standard design ("ANGA") and in mechanical VIK design ("AMGA"), without explosion protection in each case. Mechanical VIK design means that the motor construction meets the requirements of the VIK (Verband der Industriellen Energie- und Kraftwirtschaft e.V. – Committee of the Industrial Power and Power Utilities), however, without Ex-marking and is therefore not allowed to be used in hazardous areas of Zone 2. (VIK motors with Ex-certificate are indicated under the type code AMGK and E.GV in the respective chapters of this technical list).

On customer request the motors of the series ANGA and AMGA can be delivered for a fixed voltage (e.g. 400V) or for a wide voltage range (e.g. 380–420V).

The rated voltages  
400V or 380–420V  
500V or 475–525V  
690V or 655–725V

are standard voltages for 50 Hz systems. Other voltages and frequencies are possible on request. The outputs and electrical data indicated in the tables can be changed by special designs, achieving e.g. an even higher efficiency by means of a rotor with copper cage instead of aluminium die cast.

Insulation system (stator winding) and connecting (terminal boxes, terminals) of this motor series are suitable for mains voltages up to 1000V.

The general use of overcoat double-enamelled wires and optimized impregnating methods also allows an inverter operation for most motors of this series without

modifying the electrical design. The permissible basic data and parameters for inverter operation are summarized in the Technical List UN 03 (also see "FI-operation, mechanical features", in this technical list). If the inverter operation is known at order placing, these motors will be equipped with 3 PTC thermistors KL 145. The sole motor protection by means of these temperature detectors is possible in combination with specific parameter settings on the inverter. No motor protection circuit breakers are necessary. The PTC thermistors have to be connected with the thermistor connections provided in the inverter or with a tripping device (LOHER Calomat). When using a Calomat device it is possible that the motor is provided with further PTC thermistors (e.g. early warning detectors). Also see the section "Thermal motor protection". (The motors are fitted with 6 terminals, allowing "star" (Y) or "delta" (Δ) connection. Standard connection of all 400V motors is delta and therefore suitable for 400V Δ/690V Y as well as for Y-Δ starting at 400V.

The 500V motors are available both for 500V Y and 500V Δ, if not for winding reasons one of the both versions is to be preferred.

The motors of the series ANGA and AMGA have the winding executed in class F insulation, thermal utilization only to class "B". Therefore it is not necessary to contact our factory for the fixed voltage motor in case of an average output increase by 12% in continuous duty at a coolant temperature of 40°C, or an increase of the coolant temperature from 40°C to 60°C at rated output and full utilization of class F insulation. Exceptions (utilization "F" at rated output and 40°C) are identified in the output tables by an \*.

In accordance with the latest standard EN 60034-1 the thermal utilization, if it is inferior to the insulation class, will be stamped on the rating plate additionally to the insulation class. Therefore the motors of these series will be stamped with "F-B" or those identified by an \* with "F".

Both for fixed voltage (e.g. 400V, 500V or 690V) and for wide voltage range (e.g. 380–420V, 475–525V or 655–725V) a tolerance of  $\pm 5\%$  for the "Range A" is admissible to EN 60034-1 ("VDE 0530"). This results in the following:

For the fixed voltage motor, e.g. 400V, this so-called "Range A" goes from 380–420V. Within this range the motor must be reliably functioning in continuous duty, the temperature rise of the winding at the tolerance limits is allowed to be 10 K higher than the limit value of the insulation class. The electrical data ("Rated data") always refer to the mean range, e.g. to 400V. Here the temperature rise of the winding is measured and the thermal utilization is determined. The upper and lower limit of "Range A" is joined by "Range B":

Its tolerance limits are at  $\pm 10\%$  of the rated voltage. For the 400V motor these are e.g. 360–440V. An operation at these tolerance limits of "B" for a longer time is not recommended however, the motor must still be reliably functioning and is not allowed to differ essentially from the characteristic data. Range "B" is inadmissible for EEx e motors.

Accordingly, the tolerance limits of "Range A" are between 361V and 441V for the voltage range motor (e.g. 380–420V). "Range B" starts at 342V and ends at 462V. (see chart in section "Electrical design, general / voltages and frequencies" in this technical list).

## Operation with 60 Hz systems

A motor being stamped e.g. with 380–420V is to keep the limit temperature according to its insulation class at every voltage between 380V and 420V, 10K more are allowed in case of 361V and 441V.

Since there is sometimes uncertainty about the stamp data, utilization and guaranteed data of the wide voltage range motor a detailed description is given below: In principle it is to be differentiated between explosion-proof and standard motors.

For the motors ANGA and AMGA (without Ex-marking) it is to be proceeded as follows:

First the electrical data are measured exactly in the mean range and at rated output. Obtained are the power factor, efficiency, speed (torque), temperature rise (utilization!), current at mid-voltage, starting current ( $I_A/I_N$ ), noise, torque

characteristic and no-load data. All guaranteed data indicated in this list or in the data sheet must meet within the tolerances these measured values at mid-voltage. Maintaining the torque calculated from the shaft output and the rated speed ("rated torque"), both currents at the limits of the rated voltage (e.g. at 380V and at 420V) are still to be determined now. The wide voltage range motors of the series ANGA and AMGA are marked e.g. with 380V–420V and 400V as well as the respective currents.

The operator is responsible to determine the respective current for the circuit breaker setting in accordance with the actually existing mains voltage.

For clearness reasons only the usual "mid-voltages" are indicated in the output tables. As due to the

same electrical design the single voltage motor and wide voltage range motor have identical values at "mid-voltage" no differentiation is made in the output tables.

All motors of the series ANGA and AMGA being operated in the mean range are utilized to insulation class "B".

At the rated voltage limits of the wide voltage range motors a slightly higher temperature rise than in the mean range can occur. Therefore, these are generally marked on the rating plate as follows:

400V: F–B, 380–420V: F

The few exceptions are motors for which insulation class F is already required at mid-voltage. They are marked with an \* and stamped with "F".

### Operation with 60 Hz systems

If the voltage and/or frequency differ from the aforesaid standard values for 50 Hz systems, the motors will generally be designed with a non-standard winding (surcharge).

However, motors with a standard 50 Hz winding can be used with 60 Hz systems. The tables show the conditions under which this is possible depending on the frame size and the number of poles.

Particular attention must be paid to the changes which occur regarding the torques in the starting period (starting-, pull-up- and breakdown torque) in comparison with the listed values for 50 Hz. It must be considered additionally that motors with a reduction factor  $<0.87$  are generally no longer suitable for Y-Δ-starting.

The table on the right indicates the output increase factor which applies in case of a non-standard winding adapted to a 60 Hz system, depending on the frame size and the number of poles.

### Motors with standard 50 Hz winding for operation with 60 Hz systems

Range of frame sizes	Number of poles	Output at 60 Hz (listed output 50 Hz x factor)	Voltage at 60 Hz V	Winding for 50 Hz standard voltages V	Factor for torque in starting range (reduction factor) ( $M_A$ , $M_S$ , $M_K$ )
090–355	2 – 8	1.0	230	230	0.83
090–355	10 – 12		220	220	0.83
			230	220	0.89
			400	400	0.83
			380	380	0.83
			400	380	0.89
			500	500	0.83
			550	500	1.01
090–180	2	1.2	240	220	0.83
090–250	4		260	220	0.97
090–315MB	6 – 8		440	380	0.93
090–315MD	10 – 12		460	380	1.02
			575	500	0.92
200–250	2	1.15	240	220	0.87
280–355	4		260	220	1.01
315MC–355	6 – 8		440	380	0.97
315L–355	10 – 12		460	380	1.06
			575	500	0.96
280–355	2	1.12	240	220	0.89
			260	220	1.03
			440	380	1.00
			460	380	1.09
			575	500	0.99

### Output increase with a winding designed for 60 Hz operation only

2-pole		4-pole		6- to 8-pole		10- to 12-pole	
Range of frame sizes	x listed output at 50 Hz	Range of frame sizes	x listed output at 50 Hz	Range of frame sizes	x listed output at 50 Hz	Range of frame sizes	x listed output at 50 Hz
090–180	1.2	090–250	1.2	090–315MB	1.2	090–315MD	1.2
200–250	1.15						
280–355	1.12	280–355	1.15	315MC–355	1.15	315L–355	1.15



## Dual-voltage design

### Efficiency marking for 2- and 4-pole standard motors

#### Dual-voltage design

Up to frame size 200, the motors included in this technical list can be supplied in a dual-voltage design according to the table. Other voltage ratios as well as those for motors from frame size 225 must be inquired.

Voltage ratio		Starting	Reduction of output	Number of terminals
1:2	e.g. 230V $\text{YY}$ / 460V $\text{Y}$	direct	—	9 or 12
1:2	e.g. 230V $\Delta\Delta$ / 460V $\Delta$	$\text{Y}/\Delta$	—	12
1:1.32	e.g. 380V $\Delta$ / 500V $\Delta$	$\text{Y}/\Delta$	on request	9
applicable from size 160 only				
1: $\sqrt{3}$	e.g. 230V $\Delta\Delta$ / 400V $\Delta$	$\text{Y}/\Delta$	10%	12

#### Efficiency marking for 2- and 4-pole standard motors (not applicable to EEx)

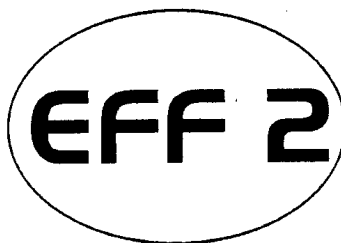
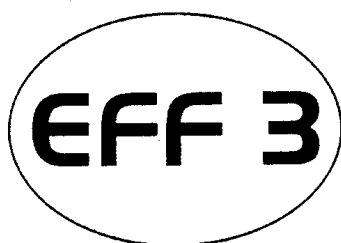
The European Sector Committee for electrical drive engineering, CE-MEP and the Directorate-General Energy of the European Commission have agreed upon that in the future all 2- and 4-pole low-voltage motors from 1 to 100 kW in standard design will be classified ac-

cording to its efficiency. The efficiency class will be indicated on the typeplates and additional data included in the documentation. It will be differentiated between the classes eff3, eff2 and eff1. eff3-motors are corresponding with the standard efficiencies currently

available on the market.

eff2 refers to the motors with improved efficiency and eff1 to high-efficient motors. The efficiency requirements of the latter mentioned are often above those of the Canadian and American requirements.

The marking is made by means of protected logos:



Additionally, in the catalogues the efficiency data for full and 3/4-load is indicated. The procedure for determination of the efficiency is based on the segregated-loss method to IEC 60034-2. For the values in the output tables the tolerances determined in EN 60034-1 are applicable.

#### The following motors come under the CE directive:

All 2- and 4-pole, 400V – 50Hz, three-phase motors with squirrel cage, in closed, self-ventilated

design (TEFC, IP 54 or IP 55), with defined Duty type “S1”, in the output range between 1.1 and 90 kW, without explosion protection, corresponding to the IEC-range, in

“Standard design”, what can be interpreted as the Type “N” of EN 60034-12.

The Loher GmbH also participates in the “Motor Challenge Program” (MCP) of the European Union, promoting the application of energy-optimized drive systems. This

means that not only single motors, but the complete drive train are taken into consideration and thus an optimum energy saving is achieved in the total process.



## Dual-voltage design

### Efficiency marking for 2- and 4-pole standard motors

#### Motor for efficiency class “eff1” (High-Efficiency Class 1)

As it can be seen from the output tables, the Loher standard motor, Series A ... is of such a high quality that it meets the requirements for all types <55 kW “eff2” and without special measures even the high-efficiency class “eff1” for the types ≥ 55 kW.

By special measures the types <55 kW can be upgraded from “eff 2” to “eff1”.

Special measures can be a copper cage in the rotor, an improved sheet metal quality, a larger laminated core as well as a special winding. Due to the higher material input the machines are made with deeper end shields and therefore involving more expenditure accordingly.

For the outputs <4 kW “eff1” is achieved by a change in type.

The efficiencies of all 3 classes for the respective output and number of poles are indicated below.

Data of the “eff1” motors on request.

Efficiency classes for 2-pole motors\*

kW	eff3 η	eff2 η	eff1 η
1.1	< 76.2	≥ 76.2	≥ 82.8
1.5	< 78.5	≥ 78.5	≥ 84.1
2.2	< 81.0	≥ 81.0	≥ 85.6
3	< 82.6	≥ 82.6	≥ 86.7
4	< 84.2	≥ 84.2	≥ 87.6
5.5	< 85.7	≥ 85.7	≥ 88.6
7.5	< 87.0	≥ 87.0	≥ 89.5
11	< 88.4	≥ 88.4	≥ 90.5
15	< 89.4	≥ 89.4	≥ 91.3
18.5	< 90.0	≥ 90.0	≥ 91.8
22	< 90.5	≥ 90.5	≥ 92.2
30	< 91.4	≥ 91.4	≥ 92.9
37	< 92.0	≥ 92.0	≥ 93.3
45	< 92.5	≥ 92.5	≥ 93.7
55	< 93.0	≥ 93.0	≥ 94.0
75	< 93.6	≥ 93.6	≥ 94.6
90	< 93.9	≥ 93.9	≥ 95.0

\* Figures in %  
Tolerances to EN 60034-1

Efficiency classes for 4-pole motors\*

kW	eff3 η	eff2 η	eff1 η
1.1	< 76.2	≥ 76.2	≥ 83.8
1.5	< 78.5	≥ 78.5	≥ 85.0
2.2	< 81.0	≥ 81.0	≥ 86.4
3	< 82.6	≥ 82.6	≥ 87.4
4	< 84.2	≥ 84.2	≥ 88.3
5.5	< 85.7	≥ 85.7	≥ 89.2
7.5	< 87.0	≥ 87.0	≥ 90.1
11	< 88.4	≥ 88.4	≥ 91.0
15	< 89.4	≥ 89.4	≥ 91.8
18.5	< 90.0	≥ 90.0	≥ 92.2
22	< 90.5	≥ 90.5	≥ 92.6
30	< 91.4	≥ 91.4	≥ 93.2
37	< 92.0	≥ 92.0	≥ 93.6
45	< 92.5	≥ 92.5	≥ 93.9
55	< 93.0	≥ 93.0	≥ 94.2
75	< 93.6	≥ 93.6	≥ 94.7
90	< 93.9	≥ 93.9	≥ 95.0

LOHER GMBH

FLENDER

LOHER

EG-Konformitätserklärung

Hersteller:

Loher GmbH

Anschrift:

Hans-Loher-Straße 32  
D-94099 Ruhstorf/Rott

Produktbezeichnung:

Drehstrom-Asynchronmaschinen der Zündschutzart "n"

A . . K-063 . . . bis A . . K-800 . . .  
A . . L-063 . . . bis A . . L-800 . . .  
J . . K-160 . . . bis J . . K-800 . . .

Das bezeichnete Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinien überein:

94/9/EG

Richtlinie des Europäischen Parlaments und des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen

Die Übereinstimmung mit den Vorschriften dieser Richtlinien wird nachgewiesen durch die vollständige Einhaltung folgender Normen:

EN 50014

EN 50021

EN 60034  
EN 60204-1

Erstmalige Anbringung der CE-Kennzeichnung: 2000

Das bezeichnete Produkt ist zum Einbau in eine andere Maschine bestimmt. Die Inbetriebnahme ist solange untersagt, bis die Konformität des Endproduktes mit der Richtlinie 89/392/EWG festgestellt ist.

Erstausgabe: 10.00  
Ruhstorf/Rott, 2003-06-23

Hofbauer  
Leiter Qualitätssicherung

Dr. Neupert  
Leiter Technik

Diese Erklärung ist keine Zusicherung von Eigenschaften im Sinne der Produkthaftung.  
Die Sicherheitshinweise der Produktdokumentation sind zu beachten.

Rev. B / 23.06.2003

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EC declaration of manufacture

(in accordance to EC directive 98/37 EG)

ENGLISH

...

The product indicated is intended solely for fitting in another machine. Commissioning is prohibited until the conformity of the end product with EC Directive 98/37 EG has been established.

Conformity with the requirements of these Directives is testified by complete adherence to the following standards:

...

This declaration is not a warranty of attributes within the meaning of the Law concerning Product Liability.  
The safety notes given in the product documentation must be observed!

Déclaration constructeur CE

(selon la Directive Européenne 98/37 EG)

Français

...

Le produit décrit ci-dessus est exclusivement destiné à être intégré dans une autre machine. La mise en service est défendue aussi longtemps que la conformité du produit final avec la directive 98/37 EG n'a pas été établie.

La conformité du produit susmentionné aux prescriptions de ces directives est démontrée par sa conformité intégrale aux normes suivantes:

...

Cette déclaration n'est pas une garantie des propriétés au sens de la loi responsabilité civile du fait des produits.  
Respecter les règles de sécurité de la documentation du produit!

Declaración de conformidad CE del fabricante

(según de la Directiva CE 98/37 EG)

ESPAÑOL

...

El producto especificado está destinado exclusivamente a su montaje en otra máquina. Se prohíbe la puesta en servicio hasta tanto se haya comprobado que el producto final concuerda con la Directiva 98/37 EG).

La conformidad con las prescripciones de estas Directivas queda justificada por haberse cumplido totalmente las siguientes normas:

...

Esta declaración no garantiza ninguna propiedad en el sentido de la Ley de responsabilidad civil sobre productos.  
Observar las indicaciones de seguridad en la documentación del producto!

Dichiarazione CE del costruttore

(in conformità della direttiva CE 98/37 EG)

ITALIANO

...

Il prodotto indicato è destinato solo a far parte di un'altra macchina. La messa in servizio non può essere eseguita finché non sia verificata la conformità del prodotto finale alla direttiva 98/37 EG.

La conformità ai requisiti delle presenti direttive viene provata dal completo rispetto delle seguenti norme nella:

...

La presente dichiarazione non rappresenta una garanzia ai sensi della legge sulla responsabilità da prodotto.  
Vanno osservate le istruzioni di sicurezza riportate nella documentazione del prodotto!

EG tillverkarförklaring

(enl. i EC direktiv 98/37 EG)

SVENSKA

...

Den angivna produkten är utslutande avsedd att monteras i en annan maskin. Idrifttagning tillåts ej förrän slutprodukten överensstämmer med direktiv 98/37 EG har fastställts.

Överensstämmelse med föreskrifterna i dessa direktiv styrks genom det absoluta respekterandet av följande normer:

...

Denna deklaration får inte uppfattas som försäkring om egenskaper enligt krav i lagen om produktansvar.  
Se akt på säkerhetsanvisningarna i produktdokumentationen!

## Series A..A, Output tables

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55

400V, 500V, 690V – 50 Hz  
Class F insulation, Utilization to B  
Outputs up to ANGA-315 MB  
in accordance with DIN EN 50347

**Types: ANGA**      **Number of poles: 2**      **– 50 Hz**

Type	Rated output	Rated speed	Rated current at			Efficiency 4/4 $\eta$	Efficiency 3/4 $\eta$	Efficiency class <sup>1</sup>	Power factor	Rotor class	Starting torque	Breakd. torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	400V A	500V A	690V A	%	%	EFF	cos $\varphi$		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 3000 min<sup>-1</sup></b>															
ANGA-090LX-02	1.5	2835	3.2	2.6	1.9	78.4	77	2	0.88	HS 5	2.5	2.7	5.9	0.0020	22
ANGA-090LB-02	2.2	2850	4.6	3.7	2.7	81.7	80	2	0.88	HS 5	2.9	3.0	6.4	0.0020	22
ANGA-100LB-02	3	2880	6	4.8	3.5	84.2	83	2	0.88	HS 5	2.7	3.0	7.0	0.0039	35
ANGA-112MB-02	4	2880	7.5	6.0	4.35	85.5	84	2	0.92	HS 5	2.9	3.5	7.2	0.0060	38
ANGA-132SB-02	5.5	2900	10.8	8.7	6.3	86.5	85.5	2	0.88	HS 5	3.0	3.3	6.6	0.0110	53
ANGA-132SD-02	7.5	2910	14.5	11.6	8.4	88	87	2	0.88	HS 5	3.4	3.8	7.4	0.0140	56
ANGA-160MB-02	11	2920	21	16.8	12.2	88.5	88.2	2	0.87	HS 5	2.7	2.9	5.9	0.0364	104
ANGA-160MD-02	15	2920	28	22.4	16.2	90	89.5	2	0.89	HS 5	2.7	3.0	6.0	0.045	106
ANGA-160LB-02	18.5	2920	33	26.5	19.2	91	90	2	0.90	HS 5	2.9	3.0	6.4	0.057	130
ANGA-180MB-02	22	2950	41.5	33.5	24	91	90	2	0.87	HS 5	2.2	3.0	7.0	0.094	162
ANGA-200LG-02	30	2960	52	42	30.5	92.5	91	2	0.91	HS 4	2.4	2.6	7.4	0.182	252
ANGA-200LJ-02	37	2955	65	52	38	93	92	2	0.90	HS 4	2.6	2.8	7.5	0.200	262
ANGA-225ME-02	45	2965	79	63	45.5	93.5	92.5	2	0.89	HS 5	2.2	2.7	7.1	0.247	305
ANGA-250ME-02	55	2975	99	79	58	94.1	93.2	1	0.86	HS 5	2.3	3.2	7.4	0.45	410
ANGA-280SG-02	75	2980	128	103	75	94.7	94	1	0.90	HS 4	2.2	2.2	6.8	0.88	555
ANGA-280MG-02	90	2975	155	124	90	95	94.5	1	0.90	HS 4	2.0	2.2	6.5	1.03	590
ANGA-315SB-02 <sup>2</sup>	110	2975	190	152	110	95	94.5		0.89	DS 4	2.0	2.4	6.5	1.61	735
ANGA-315MB-02 <sup>2</sup>	132	2980	225	180	130	95.5	95		0.89	DS 4	2.0	2.4	6.5	1.91	835
ANGA-315MD-02 <sup>2</sup>	160	2980	275	220	160	95.8	95.2		0.89	DS 4	2.3	2.6	6.7	2.3	905
ANGA-315LB-02* <sup>2</sup>	200	2980	335	270	195	96	95.6		0.90	DS 4	2.5	2.7	6.8	2.8	1085
ANGA-355MB-02	250	2980	425	340	246	96	95.6		0.89	DS 4	2.0	2.5	6.9	3.8	1360
ANGA-355LB-02*	315	2985	535	428	310	96.4	96		0.89	DS 4	2.2	2.7	7.2	4.7	1580

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

1 Explanations see "Efficiency marking"

For special design the motors of efficiency class 2 from 5.5 kW can be upgraded to efficiency class 1. [surcharge, inquiry]

2 Type ANGA-315

We reserve us the right to deliver foot-mounted types (ANSA) in welded design. (Additional weight approx. 80 kg acc. to quotation and confirmation respectively).

**Three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

400V, 500V, 690V – 50 Hz  
 Class F insulation, Utilization to B  
 Outputs up to ANGA-315 MB  
 in accordance with DIN EN 50347

**Types: ANGA****Number of poles: 4 – 50 Hz**

Type	Rated output	Rated speed	Rated current at			Efficiency 4/4 $\eta$	Efficiency 3/4 $\eta$	Efficiency class <sup>1</sup>	Power factor $\cos\varphi$	Rotor class	Starting torque	Breakd. torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J	Net weight approx.
	kW	min <sup>-1</sup>	400V A	500V A	690V A	%	%	EFF			rated torque	rated torque	rated current	kg m <sup>2</sup>	kg
<b>Speed 1500 min<sup>-1</sup></b>															
ANGA-090LX-04	1.1	1405	2.7	2.2	1.55	77	77	2	0.82	HS 4	2.1	2.3	5.0	0.0036	20
ANGA-090LB-04	1.5	1410	3.4	2.72	2.0	79	79	2	0.83	HS 5	2.5	2.7	5.1	0.0036	22
ANGA-100LB-04	2.2	1400	4.8	3.85	2.8	81	81	2	0.84	HS 5	2.2	2.5	5.3	0.0051	35
ANGA-100LD-04	3	1410	6.6	5.3	3.8	82.6	82.5	2	0.82	HS 5	2.5	2.7	5.8	0.0066	38
ANGA-112MB-04	4	1415	8.3	6.6	4.8	84	84	2	0.84	HS 5	2.2	2.6	5.9	0.012	41
ANGA-132SB-04	5.5	1440	11	8.8	6.4	87	87	2	0.85	HS 5	2.3	2.7	6.4	0.022	59
ANGA-132MB-04	7.5	1445	15	12	8.7	88	88	2	0.85	HS 5	2.6	3.0	7.2	0.030	69
ANGA-160MB-04	11	1460	21	16.8	12.2	90	90	2	0.84	HS 5	2.5	2.4	6.1	0.068	108
ANGA-160LB-04	15	1455	29	23.2	16.8	90.7	90.8	2	0.85	HS 4	2.9	2.3	6.2	0.092	130
ANGA-180MB-04	18.5	1465	34.5	28.0	20	91.3	91.3	2	0.86	DS 5	2.9	2.6	6.8	0.13	162
ANGA-180LB-04	22	1465	41	32.5	24	91.9	91.9	2	0.86	DS 5	2.9	2.5	6.7	0.16	176
ANGA-200LG-04	30	1465	55	44	31.5	92.5	92.6	2	0.87	HS 4	2.4	2.2	6.4	0.25	254
ANGA-225SE-04	37	1470	68	54.5	39.5	93	93	2	0.87	HS 4	2.2	2.2	6.3	0.35	305
ANGA-225ME-04	45	1475	84	67	49	93.2	93.1	2	0.84	HS 5	2.6	2.5	6.7	0.41	335
ANGA-250ME-04	55	1480	97	77	56	94.5	94.5	1	0.88	HS 5	2.4	2.9	7.6	0.80	425
ANGA-280SG-04	75	1480	132	106	77	94.7	94.7	1	0.88	HS 4	2.2	2.5	6.5	1.44	585
ANGA-280MG-04	90	1480	157	126	91	95	95	1	0.88	HS 4	2.3	2.5	6.5	1.65	660
ANGA-315SB-04	110	1485	200	160	116	95.2	95		0.85	DS 4	2.1	2.3	6.5	2.4	795
ANGA-315MB-04	132	1485	240	192	139	95.5	95.3		0.85	DS 4	2.1	2.3	6.5	2.9	890
ANGA-315MD-04	160	1485	285	228	165	95.6	95.5		0.86	DS 4	2.1	2.2	6.5	3.4	960
ANGA-315LB-04*	200	1485	355	285	205	95.7	95.6		0.85	DS 4	2.5	2.5	6.6	4.0	1165
ANGA-355MB-04	225	1488	400	320	232	96	95.8		0.85	DS 4	2.0	2.5	6.8	5.5	1520
ANGA-355MB-04*	250	1490	446	357	259	96	95.9		0.85	DS 4	2.0	2.5	6.9	5.5	1520
ANGA-355MB-04	250	1490	435	348	252	96.4	96.3		0.86	HS 2	1.2	2.3	6.9	5.5	1520
ANGA-355LB-04	270	1489	480	384	278	96.2	95.9		0.85	DS 4	2.1	2.5	7.0	6.8	1730
ANGA-355LB-04*	315	1489	555	444	322	96.4	96		0.85	DS 4	2.1	2.5	7.1	6.8	1730
ANGA-355LB-04	315	1491	545	436	316	96.6	96.4		0.86	HS 2	1.3	2.5	7.0	6.8	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

<sup>1</sup> Explanations see "Efficiency marking"

For special design the motors of efficiency class 2 from 5.5 kW can be upgraded to efficiency class 1. [surcharge, inquiry]

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55

Types: ANGA

Number of poles: 6 – 50 Hz

 400V, 500V, 690V – 50 Hz  
 Class F insulation, Utilization to B  
 Outputs up to ANGA-315 MB  
 in accordance with DIN EN 50347

Type	Rated output	Rated speed	Rated current at			Efficiency $\eta$	Efficiency class	Power factor	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	400V A	500V A	690V A	%	cosφ		rated torque	with direct-on starting as a multiple of the rated torque	rated current	kg m <sup>2</sup>	approx. kg
Speed 1000 min <sup>-1</sup>													
ANGA-090LX-06	0.75	900	2.2	1.76	1.28	68.3	0.76	HS 4	1.6	1.9	3.2	0.0036	22
ANGA-090LB-06	1.1	915	3.3	2.65	1.9	72	0.72	HS 4	2.0	2.3	3.3	0.0036	22
ANGA-100LB-06	1.5	940	4.2	3.4	2.45	76.4	0.7	HS 4	2.2	2.5	4.4	0.0086	35
ANGA-112MB-06	2.2	940	5.3	4.3	3.1	80	0.77	HS 3	1.7	2.0	4.2	0.014	38
ANGA-132SB-06	3	955	6.3	5.1	3.7	85.6	0.81	HS 4	2.2	2.7	6.0	0.030	59
ANGA-132MB-06	4	955	8.8	7.0	5.1	84.7	0.81	HS 4	2.3	2.6	5.5	0.033	67
ANGA-132MD-06	5.5	955	11.8	9.5	6.8	86	0.82	HS 5	2.6	2.6	6.0	0.045	72
ANGA-160MB-06	7.5	970	16	12.8	9.2	87.9	0.81	HS 5	2.4	2.8	7.0	0.100	108
ANGA-160LB-06	11	965	22.5	18	13	88.8	0.82	HS 5	2.4	2.8	6.4	0.134	130
ANGA-180LB-06	15	965	30.5	24.5	18	90	0.8	HS 4	1.6	2.6	5.5	0.13	176
ANGA-200LG-06	18.5	970	36	29	21	90.8	0.83	DS 4	2.2	2.0	5.0	0.33	262
ANGA-200LJ-06	22	965	44	36	26	90.9	0.81	DS 4	2.3	2.0	5.0	0.33	282
ANGA-225ME-06	30	975	58	46	34	91.8	0.83	DS 5	2.6	2.3	5.8	0.55	315
ANGA-250ME-06	37	985	73	58.5	42	92.5	0.8	DS 4	2.3	2.2	6.6	1.00	420
ANGA-280SG-06	45	985	81	65	47	93.3	0.87	DS 4	2.1	2.1	6.2	1.87	605
ANGA-280MG-06	55	985	100	80	58	93.4	0.86	DS 4	2.1	2.4	6.2	2.3	670
ANGA-315SB-06	75	990	136	110	79	94.6	0.85	DS 4	2.2	2.3	6.6	3.3	795
ANGA-315MB-06	90	990	160	130	93	94.8	0.86	DS 4	2.1	2.3	6.7	4.0	890
ANGA-315MC-06	110	990	195	156	113	95.2	0.87	DS 4	2.3	2.3	7.0	4.9	960
ANGA-315MD-06*	132	990	229	183	132	95.3	0.87	DS 4	2.4	2.2	6.9	4.9	960
ANGA-315LB-06	160	990	278	222	161	95.5	0.87	DS 4	2.4	2.3	7.0	6.0	1165
ANGA-355MB-06	200	993	355	284	205	96.1	0.85	HS 2	1.3	2.5	6.4	7.8	1520
ANGA-355LB-06	250	993	445	356	257	96.2	0.85	HS 2	1.1	2.5	6.3	8.9	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55

**Types: ANGA**

**Number of poles: 8**

400V, 500V, 690V – 50 Hz  
Class F insulation, Utilization to B  
Outputs up to ANGA-315 MB  
in accordance with DIN EN 50347

Type	Rated output	Rated speed	Rated current at			Efficiency $\eta$	Efficiency class	Power factor	Starting torque	Breakd. torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	400V A	500V A	690V A	%	cos $\varphi$		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 750 min<sup>-1</sup></b>													
ANGA-090LX-08	0.37	680	1.38	1.1	0.8	64	0.62	HS 4	1.6	1.9	2.7	0.0036	22
ANGA-090LB-08	0.55	670	1.90	1.5	1.1	65	0.65	HS 4	1.6	1.9	2.7	0.0036	22
ANGA-100LB-08	0.75	695	2.2	1.8	1.3	69	0.71	HS 4	2.0	2.1	3.9	0.0086	35
ANGA-100LD-08	1.1	690	3.2	2.5	1.8	70	0.73	HS 4	1.7	2.0	3.5	0.0100	38
ANGA-112MB-08	1.5	700	4.2	3.3	2.4	74	0.72	HS 4	1.9	2.1	3.7	0.0140	40
ANGA-132SB-08	2.2	715	5.6	4.5	3.2	82	0.70	HS 4	2.0	2.3	4.4	0.032	59
ANGA-132MB-08	3	715	7.5	6.0	4.4	83	0.70	HS 4	2.1	2.3	4.5	0.045	72
ANGA-160MB-08	4	715	9.2	7.4	5.3	83.5	0.76	HS 3	1.7	2.1	4.3	0.092	104
ANGA-160MD-08	5.5	725	12.9	10.3	7.5	84	0.74	HS 3	1.8	2.4	5.3	0.12	108
ANGA-160LB-08	7.5	720	17.3	13.7	10	86	0.74	HS 4	2.1	2.4	5.4	0.16	130
ANGA-180LB-08	11	715	23.3	18.6	13.4	87.5	0.78	HS 4	1.8	2.6	5.0	0.19	176
ANGA-200LG-08	15	720	32.5	26	18.7	89	0.76	HS 4	1.8	2.1	4.0	0.33	258
ANGA-225SE-08	18.5	725	39	31	22.5	89.5	0.77	HS 4	2.4	2.4	5.0	0.46	305
ANGA-225ME-08	22	730	48	38.5	27.5	90.5	0.73	HS 5	3.0	3.0	5.1	0.55	325
ANGA-250ME-08	30	735	58	46.5	33.5	91.5	0.80	HS 4	1.9	2.2	5.3	1.0	415
ANGA-280SG-08	37	735	72	58	41.5	92	0.80	DS 4	1.8	2.2	5.0	1.9	585
ANGA-280MG-08	45	740	88	71	51	92.5	0.80	DS 4	2.2	2.1	5.0	2.2	640
ANGA-315SB-08	55	740	110	87	63.5	94.5	0.78	DS 4	1.6	2.0	6.0	3.3	780
ANGA-315MB-08	75	740	146	117	85	94.4	0.79	DS 4	1.6	2.5	5.8	4.0	875
ANGA-315MC-08	90	740	175	140	102	94.4	0.79	DS 4	1.7	2.0	5.8	4.8	940
ANGA-315MD-08*	110	740	216	173	125	94.4	0.79	DS 4	1.7	2.0	5.8	4.8	940
ANGA-315LB-08*	132	740	255	205	147	94.5	0.79	DS 4	1.6	2.0	5.8	6.0	1145
ANGA-355MB-08	160	740	295	235	170	95.2	0.82	HS 2	1.3	2.0	5.3	12.4	1560
ANGA-355LB-08	200	740	370	295	214	95.5	0.82	HS 2	1.3	2.2	5.5	14.7	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55

400V, 500V, 690V – 50 Hz  
Class F insulation, Utilization to B

**Types: ANGA**

**Number of poles: 10**

Type	Rated output	Rated speed	Rated current at			Efficiency $\eta$	Efficiency class	Power factor	Starting torque	Breakd. torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	400V A	500V A	690V A	%	cos $\varphi$		rated torque			kg m <sup>2</sup>	approx. kg
<b>Speed 600 min<sup>-1</sup></b>													
ANGA-100LB-10	0.55	550	2.1	1.7	1.2	66.5	0.59	HS 4	1.9	2.0	3.0	0.009	35
ANGA-100LD-10	0.75	550	2.85	2.3	1.65	67	0.59	HS 4	2.0	2.1	3.0	0.010	38
ANGA-112MB-10	1.1	560	4.2	3.4	2.4	68	0.58	HS 3	1.7	2.1	3.0	0.017	40
ANGA-132SB-10	1.5	570	4.3	3.5	2.5	77	0.65	HS 3	1.6	2.0	3.3	0.033	59
ANGA-132MB-10	2.2	570	7.1	5.7	4.1	78	0.62	HS 3	1.8	2.3	3.5	0.04	72
ANGA-160MB-10	3	570	8.0	6.4	4.6	81	0.67	HS 4	1.9	2.5	4.4	0.09	104
ANGA-160MD-10	4	570	10.3	8.2	6.0	81	0.70	HS 4	2.0	2.5	4.7	0.12	108
ANGA-160LB-10	5.5	575	13.6	10.9	7.9	83.5	0.70	HS 3	1.8	2.2	4.9	0.15	130
ANGA-180LB-10	7.5	575	18	14.5	10.4	84	0.74	HS 3	1.8	2.9	4.9	0.19	176
ANGA-200LG-10	11	575	27	22	15.5	85	0.69	HS 3	1.8	2.9	5.0	0.33	262
ANGA-225SE-10	15	580	37	30	21	85	0.70	HS 3	1.4	2.6	4.5	0.47	305
ANGA-225ME-10	18.5	580	42	33	24	86.5	0.74	HS 3	1.5	2.6	4.8	0.55	325
ANGA-250ME-10	22	585	49	39	29	88	0.74	HS 3	1.5	2.5	5.2	1.0	425
ANGA-280SG-10	30	590	60	48	35	91	0.78	DS 4	1.9	2.1	5.0	2.2	585
ANGA-280MG-10	37	590	74	59	43	91.5	0.78	HS 3	1.7	2.0	5.0	2.6	640
ANGA-315SB-10	45	590	84	68	49	92.2	0.83	HS 3	1.5	2.4	5.9	4.2	800
ANGA-315MB-10	55	590	105	83	60	92.5	0.83	HS 3	1.5	2.4	5.9	5.1	895
ANGA-315MD-10	75	590	143	113	83	93.2	0.82	HS 3	1.5	2.6	5.9	5.9	960
ANGA-315LB-10	90	590	169	135	98	93.7	0.82	HS 3	1.3	2.3	5.9	7.5	1105
ANGA-355MB-10	110	590	205	165	120	94.2	0.82	HS 2	1.2	2.3	5.6	9.7	1450
ANGA-355MD-10	132	590	249	200	145	94.5	0.81	HS 2	1.2	2.3	5.6	11.4	1670
ANGA-355LB-10	160	590	300	241	175	94.6	0.81	HS 2	1.2	2.3	5.9	13.8	1900

Higher outputs, other voltages and frequencies on request.

Motors from frame size 315 with rotor class DS4 (Utilization to F) on request.



**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55

400V, 500V, 690V – 50 Hz  
Class F insulation, Utilization to B

**Types: ANGA**

**Number of poles: 12**

Type	Rated output	Rated speed	Rated current at			Efficiency $\eta$	Efficiency class	Power factor	Starting torque	Breakd. torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	400V A	500V A	690V A	%	cos $\varphi$		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 500 min<sup>-1</sup></b>													
ANGA-100LB-12	0.37	450	1.7	1.35	1.0	60	0.56	HS 4	1.8	1.9	2.5	0.0086	35
ANGA-100LD-12	0.55	450	2.6	2.1	1.5	59	0.55	HS 4	1.8	1.9	2.5	0.010	38
ANGA-112MB-12	0.75	440	3.5	2.7	2.0	60	0.56	HS 4	1.8	2.0	2.6	0.017	40
ANGA-132SB-12	1.1	470	4	3.2	2.3	70	0.56	HS 4	1.8	1.9	3.1	0.033	59
ANGA-132MB-12	1.5	470	5.4	4.3	3.1	74	0.57	HS 4	1.8	2.0	3.2	0.045	72
ANGA-160MB-12	2.2	465	6.8	5.5	3.9	78	0.62	HS 3	1.6	2.4	3.5	0.070	104
ANGA-160MD-12	3	465	8.8	7	5.1	78	0.65	HS 3	1.7	2.4	3.9	0.096	108
ANGA-160LB-12	4	465	10.9	8.7	6.3	79	0.67	HS 3	1.7	2.4	3.9	0.13	130
ANGA-180LB-12	5.5	465	15.2	12.2	8.8	79	0.67	HS 4	1.8	2.4	3.9	0.16	176
ANGA-200LG-12	7.5	470	20.4	16.3	11.8	84	0.64	HS 3	1.6	2.2	4.0	0.33	262
ANGA-225SE-12	11	480	28	22.5	16.2	86	0.66	HS 3	1.6	2.4	4.1	0.5	305
ANGA-225ME-12	15	480	39	31	22.5	85.5	0.66	HS 3	1.7	2.5	4.2	0.56	325
ANGA-250ME-12	18.5	485	41.5	33	24	89	0.73	HS 3	1.5	2.4	5.0	1.0	425
ANGA-280SG-12	22	485	49.5	40	28.5	90	0.71	DS 4	1.9	1.9	5.0	2.2	585
ANGA-280MG-12	30	490	68	54	39.5	91	0.71	DS 4	2.0	2.0	4.7	2.7	640
ANGA-315SB-12	37	490	82	65	47.5	91.5	0.72	HS 3	1.3	2.1	4.8	4.0	800
ANGA-315MB-12	45	485	99	79	57	91.9	0.72	HS 3	1.3	2.1	5.0	5.0	895
ANGA-315MD-12	55	485	118	94	68	92.5	0.73	HS 2	1.2	2.1	5.0	6.0	970
ANGA-315LB-12	75	490	159	127	92	92.5	0.74	HS 2	1.1	1.9	5.0	7.5	1125
ANGA-355MB-12	90	492	188	150	109	93.4	0.74	HS 2	0.9	2.0	4.3	10	1450
ANGA-355MD-12	110	492	230	185	135	93.7	0.74	HS 2	0.9	2.0	4.3	12	1670
ANGA-355LB-12	140	492	290	232	168	94	0.74	HS 2	0.9	2.0	4.3	14.5	1900

Higher outputs, other voltages and frequencies on request.

Motors from frame size 315 with rotor class DS4 (Utilization to F) on request.

## Series ANGA; Output tables

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55

**380V–420V – 50 Hz**  
Class F insulation, Utilization to B  
Outputs up to ANGA-315 MB  
in accordance with DIN EN 50347

**Types: ANGA    Number of poles: 2    – Wide voltage range**

Type	Rated output	Rated speed	Rated current at		Efficiency 4/4 $\eta$	Efficiency 3/4 $\eta$	Efficiency class <sup>1</sup>	Power factor $\cos\varphi$	Rotor class	Starting torque	Breakd. torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J kg m <sup>2</sup>	Net weight approx. kg
	kW	min <sup>-1</sup>	380V – A	420V A	%	%	EFF							
<b>Speed 3000 min<sup>-1</sup></b>														
ANGA-090LX-02	1.5	2835	3.1	- 3.3	78.4	77	2	0.88	HS 5	2.5	2.7	5.9	0.0020	22
ANGA-090LB-02	2.2	2850	4.5	- 4.7	81.7	80	2	0.88	HS 5	2.9	3.0	6.4	0.0020	22
ANGA-100LB-02	3	2880	6	- 6.2	84.2	83	2	0.88	HS 5	2.7	3.0	7.0	0.0039	35
ANGA-112MB-02	4	2880	7.8	- 7.5	85.5	84	2	0.92	HS 5	2.9	3.5	7.2	0.0060	38
ANGA-132SB-02	5.5	2900	10.9	- 11	86.5	85.5	2	0.88	HS 5	3.0	3.3	6.6	0.0110	53
ANGA-132SD-02	7.5	2910	14.5	- 15	88	87	2	0.88	HS 5	3.4	3.8	7.4	0.0140	56
ANGA-160MB-02	11	2920	22	- 20	88.5	88.2	2	0.87	HS 5	2.7	2.9	5.9	0.0364	104
ANGA-160MD-02	15	2920	29	- 28	90	89.5	2	0.89	HS 5	2.7	3.0	6.0	0.045	106
ANGA-160LB-02	18.5	2920	34.5	- 32	91	90	2	0.90	HS 5	2.9	3.0	6.4	0.057	130
ANGA-180MB-02	22	2950	42	- 42	91	90	2	0.87	HS 5	2.2	3.0	7.0	0.094	162
ANGA-200LG-02	30	2960	54	- 54	92.5	91	2	0.91	HS 4	2.4	2.6	7.4	0.182	252
ANGA-200LJ-02	37	2955	67	- 65	93	92	2	0.90	HS 4	2.6	2.8	7.5	0.200	262
ANGA-225ME-02	45	2965	82	- 78	93.5	92.5	2	0.89	HS 5	2.2	2.7	7.1	0.247	305
ANGA-250ME-02	55	2975	101	- 101	94.1	93.2	1	0.86	HS 5	2.3	3.2	7.4	0.45	410
ANGA-280SG-02	75	2980	134	- 125	94.7	94	1	0.90	HS 4	2.2	2.2	6.8	0.88	555
ANGA-280MG-02	90	2975	160	- 150	95	94.5	1	0.90	HS 4	2.0	2.2	6.5	1.03	590
ANGA-315SB-02 <sup>2</sup>	110	2975	198	- 185	95	94.5		0.89	DS 4	2.0	2.4	6.5	1.61	735
ANGA-315MB-02 <sup>2</sup>	132	2980	240	- 220	95.5	95		0.89	DS 4	2.0	2.4	6.5	1.91	835
ANGA-315MD-02 <sup>2</sup>	160	2980	285	- 265	95.8	95.2		0.89	DS 4	2.3	2.6	6.7	2.3	905
ANGA-315LB-02* <sup>2</sup>	200	2980	355	- 320	96	95.6		0.90	DS 4	2.5	2.7	6.8	2.8	1085
ANGA-355MB-02	250	2980	450	- 410	96	95.6		0.89	DS 4	2.0	2.5	6.9	3.8	1360
ANGA-355LB-02*	315	2985	560	- 510	96.4	96		0.89	DS 4	2.2	2.7	7.2	4.7	1580

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**1** Explanations see "Efficiency marking"  
For special design the motors of efficiency class 2 from 5.5 kW can be upgraded to efficiency class 1. [surcharge, inquiry]


**2** Type ANGA-315

We reserve us the right to deliver foot-mounted types (ANSA) in welded design.  
(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55

**Types: ANGA Number of poles: 2 - Wide voltage range**

**380V–420V – 50 Hz**  
Class F insulation, Utilization to B  
Outputs up to ANGA-315 MB  
in accordance with DIN EN 50347

Type	Rated output	Rated speed	Rated current at		Efficiency 4/4 $\eta$	Efficiency 3/4 $\eta$	Efficiency class <sup>1</sup>	Power factor $\cos\varphi$	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	380V – A	420V A	%	%				with direct-on starting as a multiple of the rated torque	with direct-on starting as a multiple of the rated torque	with direct-on starting as a multiple of the rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 1500 min<sup>-1</sup></b>														
ANGA-090LX-04	1.1	1405	2.7 -	2.75	77	77	2	0.82	HS 4	2.1	2.3	5.0	0.0036	20
ANGA-090LB-04	1.5	1410	3.4 -	3.5	79	79	2	0.83	HS 5	2.5	2.7	5.1	0.0036	22
ANGA-100LB-04	2.2	1400	4.8 -	5	81	81	2	0.84	HS 5	2.2	2.5	5.3	0.0051	35
ANGA-100LD-04	3	1410	6.5 -	6.7	82.6	82.5	2	0.82	HS 5	2.5	2.7	5.8	0.0066	38
ANGA-112MB-04	4	1415	8.3 -	8.3	84	84	2	0.84	HS 5	2.2	2.6	5.9	0.012	41
ANGA-132SB-04	5.5	1440	11 -	11	87	87	2	0.85	HS 5	2.3	2.7	6.4	0.022	59
ANGA-132MB-04	7.5	1445	15 -	15	88	88	2	0.85	HS 5	2.6	3.0	7.2	0.030	69
ANGA-160MB-04	11	1460	21.5 -	21	90	90	2	0.84	HS 5	2.5	2.4	6.1	0.068	108
ANGA-160LB-04	15	1455	30 -	28	90.7	90.8	2	0.85	HS 4	2.9	2.3	6.2	0.092	130
ANGA-180MB-04	18.5	1465	35.5 -	34	91.3	91.3	2	0.86	DS 5	2.9	2.6	6.8	0.13	162
ANGA-180LB-04	22	1465	42 -	40	91.9	91.9	2	0.86	DS 5	2.9	2.5	6.7	0.16	176
ANGA-200LG-04	30	1465	57 -	53	92.5	92.6	2	0.87	HS 4	2.4	2.2	6.4	0.25	254
ANGA-225SE-04	37	1470	70 -	65	93	93	2	0.87	HS 4	2.2	2.2	6.3	0.35	305
ANGA-225ME-04	45	1475	87 -	83	93.2	93.1	2	0.84	HS 5	2.6	2.5	6.7	0.41	335
ANGA-250ME-04	55	1480	100 -	95	94.5	94.5	1	0.88	HS 5	2.4	2.9	7.6	0.80	425
ANGA-280SG-04	75	1480	137 -	125	94.7	94.7	1	0.88	HS 4	2.2	2.5	6.5	1.44	585
ANGA-280MG-04	90	1480	169 -	152	95	95	1	0.88	HS 4	2.3	2.5	6.5	1.65	660
ANGA-315SB-04	110	1485	205 -	195	95.2	95		0.85	DS 4	2.1	2.3	6.5	2.4	795
ANGA-315MB-04	132	1485	250 -	230	95.5	95.3		0.85	DS 4	2.1	2.3	6.5	2.9	890
ANGA-315MD-04	160	1485	300 -	275	95.6	95.5		0.86	DS 4	2.1	2.2	6.5	3.4	960
ANGA-315LB-04*	200	1485	375 -	345	95.7	95.6		0.85	DS 4	2.5	2.5	6.6	4.0	1165
ANGA-355MB-04	225	1488	420 -	385	96	95.8		0.85	DS 4	2.0	2.5	6.8	5.5	1520
ANGA-355MB-04*	250	1490	475 -	425	96	95.9		0.85	DS 4	2.0	2.5	6.9	5.5	1520
ANGA-355MB-04	250	1490	455 -	420	96.4	96.3		0.86	HS 2	1.2	2.3	6.9	5.5	1520
ANGA-355LB-04	270	1489	505 -	460	96.2	95.9		0.85	DS 4	2.1	2.5	7.0	6.8	1730
ANGA-355LB-04*	315	1489	590 -	530	96.4	96		0.85	DS 4	2.1	2.5	7.1	6.8	1730
ANGA-355LB-04	315	1491	570 -	530	96.6	96.4		0.86	HS 2	1.3	2.5	7.0	6.8	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

<sup>1</sup> Explanations see "Efficiency marking"

For special design the motors of efficiency class 2 from 5.5 kW can be upgraded to efficiency class 1. [surcharge, inquiry]

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55

**Types: ANGA      Number of poles: 6 – Wide voltage range**

**380V–420V – 50 Hz**  
Class F insulation, Utilization to B  
Outputs up to ANGA-315 MB  
in accordance with DIN EN 50347

Type	Rated output	Rated speed	Rated current at		Efficiency η	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia	Net weight
	kW	min <sup>-1</sup>	380V – 420V A      A		%	cosφ		rated torque	with direct-on starting as a multiple of the rated torque	rated current	J kg m <sup>2</sup>	approx. kg
Speed 1000 min <sup>-1</sup>												
ANGA-090LX-06	0.75	900	2.2	- 2.3	68.3	0.76	HS 4	1.6	1.9	3.2	0.0036	22
ANGA-090LB-06	1.1	915	3.3	- 3.5	72	0.72	HS 4	2.0	2.3	3.3	0.0036	22
ANGA-100LB-06	1.5	940	4	- 4.4	76.4	0.7	HS 4	2.2	2.5	4.4	0.0086	35
ANGA-112MB-06	2.2	940	5.2	- 5.4	80	0.77	HS 3	1.7	2.0	4.2	0.014	38
ANGA-132SB-06	3	955	6.6	- 6.3	85.6	0.81	HS 4	2.2	2.7	6.0	0.033	59
ANGA-132MB-06	4	955	8.8	- 9.1	84.7	0.81	HS 4	2.3	2.6	5.5	0.033	67
ANGA-132MD-06	5.5	955	12.2	- 11.6	86	0.82	HS 5	2.6	2.6	6.0	0.045	72
ANGA-160MB-06	7.5	970	16.3	- 16	87.9	0.81	HS 5	2.4	2.8	7.0	0.100	108
ANGA-160LB-06	11	965	23	- 22	88.8	0.82	HS 5	2.4	2.8	6.4	0.134	130
ANGA-180LB-06	15	965	31	- 30.5	90	0.8	HS 4	1.6	2.6	5.5	0.13	176
ANGA-200LG-06	18.5	970	37.5	- 35	90.8	0.83	DS 4	2.2	2.0	5.0	0.33	262
ANGA-200LJ-06	22	965	45	- 43	90.9	0.81	DS 4	2.3	2.0	5.0	0.33	282
ANGA-225ME-06	30	975	59	- 57	91.8	0.83	DS 5	2.6	2.3	5.8	0.55	315
ANGA-250ME-06	37	985	75	- 76	92.5	0.8	DS 4	2.3	2.2	6.6	1.00	420
ANGA-280SG-06	45	985	85	- 78	93.3	0.87	DS 4	2.1	2.1	6.2	1.87	605
ANGA-280MG-06	55	985	104	- 96	93.4	0.86	DS 4	2.1	2.4	6.2	2.3	670
ANGA-315SB-06	75	990	142	- 131	94.6	0.85	DS 4	2.2	2.3	6.6	3.3	795
ANGA-315MB-06	90	990	168	- 154	94.8	0.86	DS 4	2.1	2.3	6.7	4.0	890
ANGA-315MC-06	110	990	205	- 118	95.2	0.87	DS 4	2.3	2.3	7.0	4.9	960
ANGA-315MD-06*	132	990	240	- 224	95.3	0.87	DS 4	2.4	2.2	6.9	4.9	960
ANGA-315LB-06*	160	990	290	- 268	95.5	0.87	DS 4	2.4	2.3	7.0	6.0	1165
ANGA-355MB-06	200	993	370	- 350	96.1	0.85	HS 2	1.3	2.5	6.4	7.8	1520
ANGA-355LB-06	250	993	467	- 436	96.2	0.85	HS 2	1.1	2.5	6.3	8.9	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

## Series A..A, Output tables

Three-phase motors with squirrel cage  
Totally enclosed fan-cooled, enclosure IP 55

440V – 60 Hz  
Class F insulation, Utilization to B

Types: ANGA                      Number of poles: 2                      – 60 Hz

Type	Rated output	Rated speed	Rated current at	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	440V A	%	cos $\varphi$		rated torque	with direct-on starting as a multiple of the rated torque	with direct-on starting as a multiple of the rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 3600 min<sup>-1</sup></b>											
ANGA-090LX-02	1.8	3415	3.3	81	0.9	HS 5	2.7	2.8	7.0	0.0020	22
ANGA-090LB-02	2.6	3440	4.85	82	0.87	HS 5	3.1	3.2	6.9	0.0020	22
ANGA-100LB-02	3.6	3465	6.5	85	0.88	HS 5	2.8	3.1	7.1	0.0039	35
ANGA-112MB-02	4.8	3480	8.2	85.5	0.91	HS 5	3.0	3.6	7.3	0.0060	38
ANGA-132SB-02	6.5	3500	11.8	85.5	0.87	HS 5	3.0	3.2	6.7	0.0110	53
ANGA-132SD-02	8.6	3490	14.4	88	0.89	HS 5	2.9	3.4	7.0	0.0140	56
ANGA-160MB-02	13.2	3520	22	90.5	0.88	HS 5	2.5	2.9	6.2	0.0364	104
ANGA-160MD-02	18	3520	30.5	90.5	0.87	HS 5	3.0	3.1	6.3	0.045	106
ANGA-160LB-02	22	3520	35.5	91.2	0.89	HS 5	2.9	2.9	6.8	0.057	130
ANGA-180MB-02	26	3550	46.5	91.2	0.86	HS 5	2.1	2.8	6.8	0.094	162
ANGA-200LG-02	36	3555	56	93.5	0.91	HS 5	2.4	2.7	6.8	0.182	252
ANGA-200LJ-02	44	3560	69	94	0.89	HS 5	2.5	2.8	7.5	0.200	262
ANGA-225ME-02	54	3560	86	94	0.88	HS 5	2.2	2.6	7.1	0.247	305
ANGA-250ME-02	65	3570	105	94	0.86	HS 5	2.3	3.1	7.1	0.45	410
ANGA-280SG-02	86	3575	138	94.7	0.87	HS 4	2.1	2.1	6.8	0.88	555
ANGA-280MG-02	110	3575	174	95	0.88	HS 4	2.0	2.3	7.0	1.03	590
ANGA-315SB-02 <sup>1</sup>	120	3580	191	95	0.88	DS 4	1.9	2.5	6.5	1.61	735
ANGA-315MB-02* <sup>1</sup>	143	3575	220	95.8	0.89	DS 4	2.0	2.4	6.4	1.91	835
ANGA-315MD-02 <sup>1</sup>	185	3580	285	95.8	0.89	DS 4	2.4	2.6	6.9	2.3	905
ANGA-315LB-02* <sup>1</sup>	220	3580	335	96	0.89	DS 4	2.5	2.7	7.1	2.8	1085
ANGA-355MB-02	275	3580	425	96	0.89	DS 4	2.2	2.6	7.1	3.8	1360
ANGA-355LB-02	345	3580	535	96.6	0.88	DS 4	2.2	2.6	7.4	4.7	1580

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

<sup>1</sup> Type ANGA-315

We reserve us the right to deliver foot-mounted types (ANSA) in welded design.  
(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

**Three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

440V – 60 Hz

Class F insulation, Utilization to B

**Types: ANGA****Number of poles: 4 – 60 Hz**

Type	Rated output	Rated speed	Rated current at	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	440V A	%	cos $\varphi$		rated torque	with direct-on starting as a multiple of the rated torque	as a multiple of the rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 1800 min<sup>-1</sup></b>											
ANGA-090LX-04	1.5	1685	3	79	0.84	HS 4	2.2	2.4	5.0	0.0036	20
ANGA-090LB-04	1.8	1710	3.65	80	0.82	HS 4	2.2	2.3	5.1	0.0036	22
ANGA-100LB-04	2.6	1700	5.3	81.5	0.84	HS 5	2.2	2.4	5.3	0.0051	35
ANGA-100LD-04	3.4	1700	6.6	83	0.83	HS 5	2.6	2.7	5.8	0.0066	38
ANGA-112MB-04	4.8	1720	8.8	85	0.84	HS 5	2.3	2.6	5.9	0.012	41
ANGA-132SB-04	6.6	1740	11.4	88	0.86	HS 5	2.2	2.6	6.8	0.022	59
ANGA-132MB-04	8.6	1735	15	88.5	0.85	HS 5	2.2	2.5	6.9	0.030	69
ANGA-160MB-04	13.2	1760	23	31	0.84	HS 5	2.6	2.5	6.2	0.068	108
ANGA-160LB-04	17	1750	29.5	91.2	0.84	HS 5	2.9	2.4	6.3	0.092	130
ANGA-180MB-04	22	1765	36.6	92	0.87	DS 5	2.9	2.4	6.3	0.13	162
ANGA-180LB-04	25	1765	41.5	92	0.86	DS 5	2.9	2.5	6.3	0.16	176
ANGA-200LG-04	36	1765	60	92.9	0.86	HS 5	2.5	2.4	6.4	0.25	254
ANGA-225SE-04	43	1770	73	93.2	0.84	HS 5	2.3	2.5	5.9	0.35	305
ANGA-225ME-04	52	1770	90	93.9	0.83	HS 5	2.8	2.7	6.8	0.41	335
ANGA-250ME-04	63	1780	103	94.5	0.85	HS 5	2.3	2.6	7.2	0.80	425
ANGA-280SG-04	85	1780	138	94.8	0.85	HS 5	2.3	2.6	6.6	1.44	585
ANGA-280MG-04	100	1780	161	95	0.87	HS 5	2.3	2.5	6.6	1.65	660
ANGA-315SB-04	126	1785	208	95.1	0.84	DS 4	2.2	2.3	6.5	2.4	795
ANGA-315MB-04	150	1785	245	95.5	0.85	DS 4	2.2	2.2	6.5	2.9	890
ANGA-315MD-04	180	1785	290	95.5	0.85	DS 4	2.2	2.2	6.8	3.4	960
ANGA-315LB-04	220	1785	360	95.8	0.84	DS 4	2.6	2.5	6.8	4.0	1165
ANGA-355MB-04	240	1790	385	95.8	0.85	DS 4	2.0	2.4	6.9	5.5	1520
ANGA-355MB-04*	275	1790	445	95.8	0.84	DS 4	2.1	2.5	6.9	5.5	1520
ANGA-355MB-04	275	1790	435	96.3	0.86	HS 2	1.0	2.4	6.9	5.5	1520
ANGA-355LB-04	300	1790	475	96.1	0.86	DS 4	1.9	2.2	6.8	6.8	1730
ANGA-355LB-04*	340	1790	545	96.4	0.85	DS 4	2.0	2.4	7.0	6.8	1730
ANGA-355LB-04*	350	1792	560	96.7	0.85	HS 2	1.2	2.6	7.1	6.8	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55

**Types: ANGA**

**Number of poles: 6 – 60 Hz**

440V – 60 Hz  
Class F insulation, Utilization to B  
Temperature class T4

Type	Rated output	Rated speed	Rated current at	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	440V A	%	cos $\varphi$		rated torque	with direct-on starting as a multiple of the rated torque	with direct-on starting as a multiple of the rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 1200 min<sup>-1</sup></b>											
ANGA-090LX-06	0.90	1095	2.3	69.0	0.75	HS 4	1.7	2.0	3.4	0.0036	22
ANGA-090LB-06	1.32	1100	3.4	73.5	0.74	HS 4	2.0	2.3	3.8	0.0036	22
ANGA-100LB-06	1.8	1140	4.5	78.0	0.74	HS 4	2.3	2.5	4.9	0.0086	35
ANGA-112MB-06	2.6	1150	5.8	83.0	0.73	HS 3	1.8	2.1	4.9	0.014	38
ANGA-132SB-06	3.6	1150	6.9	86.0	0.81	HS 4	2.1	2.6	6.0	0.030	59
ANGA-132MB-06	4.8	1150	9.3	85.0	0.81	HS 4	2.3	2.6	6.0	0.033	67
ANGA-132MD-06	6.6	1150	12.8	86.5	0.80	HS 5	2.6	2.6	6.0	0.045	72
ANGA-160MB-06	9.0	1165	16.6	88.5	0.81	HS 5	2.2	2.7	6.5	0.100	108
ANGA-160LB-06	13.2	1160	23.5	89.5	0.82	HS 5	2.3	2.6	6.9	0.134	130
ANGA-180LB-06	18.0	1165	34	91.0	0.79	HS 4	1.5	2.5	5.8	0.13	176
ANGA-200LG-06	22	1170	40.5	91.5	0.79	DS 4	2.4	2.2	5.3	0.33	262
ANGA-200LJ-06	26	1170	48.5	91.6	0.79	DS 4	2.5	2.3	5.4	0.33	282
ANGA-225ME-06	36	1175	63	92.8	0.82	DS 4	2.4	2.1	5.9	0.55	315
ANGA-250ME-06	43	1185	77	93.2	0.80	DS 4	2.3	2.2	6.8	1.00	420
ANGA-280SG-06**	54	1185	89	93.0	0.86	DS 4	2.2	2.2	6.0	1.87	605
ANGA-280MG-06**	63	1185	103	93.5	0.86	DS 4	2.1	2.3	6.2	2.3	670
ANGA-315SB-06	85	1190	137	95.0	0.86	DS 4	2.1	2.2	6.7	3.3	795
ANGA-315MB-06	105	1190	168	95.4	0.85	DS 4	1.9	2.2	6.7	4.0	890
ANGA-315MC-06	132	1190	207	95.6	0.87	DS 4	2.1	2.3	6.8	4.9	960
ANGA-315MD-06	150	1190	235	95.8	0.87	DS 4	2.0	2.2	6.7	4.9	960
ANGA-315LB-06	170	1190	265	95.8	0.87	DS 4	2.0	2.1	6.7	6.0	1165
ANGA-355MB-06	230	1192	370	96.3	0.85	HS 2	1.1	2.4	6.4	7.8	1520
ANGA-355LB-06	280	1192	440	96.6	0.86	HS 2	1.1	2.4	6.3	8.9	1730

Higher outputs, other voltages and frequencies on request.

\*\* Larger laminated core possible, then higher output, on request.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: ANGA****Number of poles: 4 / 2**

Type	Rated output	Rated speed	Rated current	Rotor class	Starting torque	Starting current	Moment of inertia	Net weight
			at 400V		with direct-on starting as a multiple of the rated torque	with direct-on starting as a multiple of the rated current	J	
	kW	min <sup>-1</sup>	A				kg m <sup>2</sup>	approx. kg

**Pole-changing for 2 speeds with 1 Dahlander-connected winding****Speed 1500/3000 min<sup>-1</sup>**

ANGA-090LB-42	1.45/1.9	1425/2875	3.6/4.2	HS 4	1.9/2.0	4.7/6.0	0.0036	22
ANGA-100LD-42	2.6/3.2	1420/2850	6.1/6.6	HS 5	2.2/2.2	5.1/6.0	0.0066	35
ANGA-112MB-42	3.6/4.3	1410/2870	7.8/8.7	HS 3	1.7/1.8	4.5/5.9	0.011	38
ANGA-132SB-42	4.9/6	1450/2915	9.8/12.1	HS 4	2.0/2.3	6.5/7.6	0.022	59
ANGA-132MB-42	6.5/9	1450/2920	13.5/17.3	HS 5	2.8/2.3	7.0/7.5	0.03	69
ANGA-160MB-42	9/11	1455/2920	17.8/21	HS 4/5	2.3/2.4	5.6/6.5	0.068	108
ANGA-160LB-42	13/16	1460/2930	26.1/31	HS 5	3.0/3.2	6.5/7.7	0.092	130
ANGA-180MB-42	16.5/20	1465/2940	31/37	HS 5	2.5/2.4	5.8/6.9	0.13	162
ANGA-180LB-42	18.5/25	1465/2935	34.5/45	HS 5	2.6/2.2	5.7/6.2	0.16	176
ANGA-200LG-42	26/31	1470/2960	48/56	HS 5	2.5/2.6	6.6/8	0.25	254
ANGA-225SE-42	32/38	1475/2960	59/71	HS 5	2.2/2.7	6.5/7	0.34	305
ANGA-225ME-42	38/46	1475/2965	70/84	HS 5	2.8/3.3	7.3/8.5	0.41	335
ANGA-250ME-42	45/55	1465/2945	86/95	HS 4	2.1/2.0	5.0/6.5	0.79	425
ANGA-280SG-42	60/75	1475/2965	110/126	HS 4	2.0/1.8	5.7/6.6	1.43	575
ANGA-280MG-42	73/90	1480/2970	129/149	HS 4	2.0/1.7	5.9/7.8	1.66	650
ANGA-315SB-42 <sup>1</sup>	82/96	1485/2980	152/163	HS 4	2/2.1	6/7.0	1.8	795
ANGA-315MB-42 <sup>1</sup>	100/124	1485/2975	181/202	HS 2/3	1.3/1.3	5.5/6.8	2.1	890
ANGA-315MD-42 <sup>1</sup>	120/145	1485/2975	214/233	HS 2	1.3/1.3	5.5/6.8	2.5	960
ANGA-315LB-42 <sup>1</sup>	142/172	1485/2975	253/276	HS 2	1.3/1.3	5.6/6.8	3.0	1165
ANGA-355MB-42	150/200	1485/2985	275/335	HS 3	1.6/1.6	5.0/6.8	4.3	1520
ANGA-355LB-42	180/250	1485/2985	355/420	HS 2	1.2/1.3	5.0/6.8	5.3	1730

Higher outputs, other voltages and frequencies on request.

<sup>1</sup> Type ANGA-315

We reserve us the right to deliver foot-mounted types (ANSA) in welded design.

(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

\* Utilization to insulation class F.



**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: ANGA****Number of poles: 6 / 4**

Type	Rated output	Rated speed	Rated current	Rotor class	Starting torque	Starting current	Moment of inertia	Net weight
			at 400V		with direct-on starting as a multiple of the rated torque		J	
	kW	min <sup>-1</sup>	A			rated current	kg m <sup>2</sup>	approx. kg

**Pole-changing for 2 speeds with 2 separate windings****Speed 1000/1500 min<sup>-1</sup>**

ANGA-090LB-64	0.6/0.9	930/1415	1.95/2.5	HS 3	2.1/1.8	3.5/4.2	0.004	22
ANGA-100LD-64	1.1/1.5	940/1410	3.5/3.6	HS 3	1.8/1.5	3.8/4.5	0.007	35
ANGA-112MB-64	1.5/2.2	960/1450	4.1/4.8	HS 4	2.2/1.7	5.0/5.8	0.011	38
ANGA-132SB-64	2.2/3.3	960/1460	6.1/7.4	HS 4/5	1.9/2.0	5.0/6.8	0.024	59
ANGA-132MB-64	3/4.5	965/1465	7.5/9	HS 4	2.4/2.1	6.1/7.5	0.03	69
ANGA-160MB-64	4.5/6.5	965/1465	9.4/12.8	HS 4	1.9/1.8	5.7/7.4	0.068	108
ANGA-160LB-64	6.5/9.5	970/1460	13.5/17.8	HS 4	2.0/1.8	6.5/6.9	0.092	130
ANGA-180LB-64	11/16	970/1460	23/30	HS 3	1.9/1.7	6/6.8	0.13	176
ANGA-200LG-64	13/19	970/1460	27/34	DS 4	2.9/2.3	6.0/6.5	0.25	254
ANGA-200LJ-64	15/23	975/1470	31/41	DS 5	2.8/2.4	6.4/6.8	0.25	254
ANGA-225SE-64	18/27	975/1470	40/51	DS 5/4	2.8/2.2	5.2/5.7	0.34	305
ANGA-225ME-64	21/31	980/1480	44/58	DS 5	2.8/2.2	5.5/6.0	0.41	335
ANGA-250ME-64	28/40	980/1480	55/72	HS 5/4	2.8/2.0	6.3/7.0	0.79	425
ANGA-280SG-64	43/65	985/1485	78/114	HS 4	2.0/1.9	5.6/6.8	1.7	575
ANGA-280MG-64	52/78	985/1485	95/137	HS 4	2.2/2.0	6.0/6.9	2.0	650
ANGA-315SB-64*	60/90	985/1485	120/160	DS 5/4	2.8/2.2	5.8/6.1	2.3	795
ANGA-315MB-64*	70/100	985/1485	140/179	HS 5	2.8/2.2	5.8/6.1	2.8	890
ANGA-315MD-64*	80/115	985/1485	150/200	DS 5/4	2.8/2.2	5.8/6.1	3.3	960
ANGA-315LB-64*	100/140	985/1485	187/245	DS 5/4	2.7/2.0	5.8/6.0	3.9	1165
ANGA-355MB-64	125/180	990/1490	235/315	HS 2	1.5/1.1	6.0/6.5	6.9	1520
ANGA-355LB-64	155/225	990/1490	290/390	HS 2	1.6/1.1	6.0/6.5	8.5	1730

Higher outputs, other voltages and frequencies on request.

1 Type ANGA-315

We reserve us the right to deliver foot-mounted types (ANSA) in welded design.

(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

\* Utilization to insulation class F.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: ANGA****Number of poles: 8 / 4**

Type	Rated output	Rated speed	Rated current	Rotor class	Starting torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	at 400V A		with direct-on starting as a multiple of the rated torque	as a multiple of the rated current	kg m <sup>2</sup>	approx. kg

**Pole-changing for 2 speeds with 1 Dahlander-connected winding****Speed 750/1500 min<sup>-1</sup>**

ANGA-090LB-84	0.5/0.8	680/1440	2.15/2.15	HS 3/4	1.7/2.3	2.8/5.0	0.0036	22
ANGA-100LD-84	1/1.6	705/1450	3.6/3.9	HS 3/4	1.8/1.8	3.2/5.6	0.010	35
ANGA-112MB-84	1.4/2.2	710/1440	4.1/4.9	HS 3	1.9/1.7	3.8/4.8	0.0136	40
ANGA-132SB-84	2.3/3.4	715/1440	5.9/7.3	HS 3	1.8/1.7	4.2/5.0	0.033	59
ANGA-132MB-84	3/5	720/1460	8.3/11	HS 4	2.3/1.8	5.0/5.8	0.045	72
ANGA-160MB-84	4/5.5	710/1440	9/10.8	HS 3	1.4/1.6	4.0/5.3	0.091	104
ANGA-160MD-84	5/7.5	720/1440	11.3/15	HS 4	1.9/1.7	5.0/5.5	0.12	108
ANGA-160LB-84	7/11	720/1440	15.5/22.3	HS 4	1.9/1.7	5.5/5.6	0.16	130
ANGA-180LB-84*	11/18	725/1455	24.5/33.3	HS 4	2.1/2.0	5.5/6.7	0.19	176
ANGA-200LG-84	17/25	720/1450	39/44.5	HS 4	2.3/2.3	4.3/6.0	0.33	258
ANGA-225SE-84*	22/31	725/1470	54/56	HS 5	2.9/2.8	5.0/7.0	0.46	305
ANGA-225ME-84*	26/38	730/1470	59/67	HS 5	3/3	5.0/6.9	0.55	325
ANGA-250ME-84	32/46	740/1480	68/80	HS 5	2.6/2.5	6.0/7.5	1.0	415
ANGA-280SG-84	42/60	735/1480	85/103	HS 4	1.9/2.0	5.0/6.5	2.26	585
ANGA-280MG-84	50/72	740/1480	101/124	HS 5	2.2/2.3	5.0/7.1	2.88	640
ANGA-315SB-84	60/83	740/1485	135/141	HS 4	1.8/1.9	4.9/7.0	3.4	780
ANGA-315MB-84	72/110	740/1485	160/187	HS 4	1.7/1.9	4.8/7.2	4	875
ANGA-315MD-84	90/132	740/1485	190/221	HS 3/4	1.7/1.7	4.9/6.8	4.8	940
ANGA-315LB-84*	115/160	740/1490	242/266	HS 3/4	1.6/1.9	5.0/7.0	6	1145
ANGA-355MB-84	145/220	745/1490	305/370	HS 2	1.3/1.3	4.2/6.2	10	1560
ANGA-355LB-84	175/275	745/1490	370/460	HS 2	1.5/1.4	4.5/6.7	12	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: ANGA****Number of poles: 8 / 6**

Type	Rated output	Rated speed	Rated current at 400V	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J kg m <sup>2</sup>	Net weight approx. kg
	kW	min <sup>-1</sup>	A					

**Pole-changing for 2 speeds with 2 separate windings****Speed 750/1000 min<sup>-1</sup>**

ANGA-090LB-86	0.45/0.6	695/945	1.95/2.0	HS 3	1.5/1.5	2.5/3.3	0.0036	22
ANGA-100LB-86	0.6/0.8	710/965	2.25/2.45	HS 4	2.1/1.9	3.5/4.0	0.0086	35
ANGA-100LD-86	0.7/0.9	720/970	2.8/3.1	HS 4	2.1/2.0	3.5/4.2	0.01	35
ANGA-112MB-86	1/1.4	720/965	3.5/3.9	HS 4	1.8/1.6	3.4/4.3	0.0167	38
ANGA-132SB-86	1.5/2	715/970	4.6/5.9	HS 4	2.0/1.9	4.3/5.5	0.033	59
ANGA-132MB-86	2.2/3	715/970	7.6/9.5	HS 5	2.7/2.5	5.6/6.0	0.045	72
ANGA-160MB-86	4/5.5	720/970	9.2/11.9	HS 4	2.3/1.9	5.7/6.0	0.094	108
ANGA-160LB-86	5.5/7.5	720/965	11.7/15.8	HS 4	2.2/1.9	6.0/6.3	0.13	130
ANGA-180LB-86	8.5/11	725/980	19.5/25.7	HS 4/3	1.6/1.5	5.4/5.8	0.19	176
ANGA-200LG-86*	14.5/19	715/975	30/37.5	HS 4	2.0/2.0	4.5/5.7	0.33	282
ANGA-225SE-86	16/21	720/980	35/44	DS 5	2.6/2.8	4.5/6.0	0.46	305
ANGA-225ME-86	19/25	725/975	42/52	DS 5	2.5/2.5	5.0/6.0	0.55	315
ANGA-250ME-86	24/32	735/985	50/62	DS 4	2.4/1.9	5.7/6.6	1.0	420
ANGA-280SE-86	33/44	740/990	67/83	HS 4/3	1.9/1.6	4.7/5.3	1.73	605
ANGA-280ME-86	40/53	740/990	83/99	HS 5	2.3/1.7	5.6/5.8	2.06	670
ANGA-315SB-86*	50/65	741/991	99/120	DS 5/4	2.5/1.5	6.6/6.3	3.38	795
ANGA-315MB-86	60/80	741/991	116/147	DS 4	2.4/1.3	6.9/6.6	4.06	890
ANGA-315MD-86*	70/95	741/991	135/171	DS 4	2.5/1.7	6.6/6.8	4.84	960
ANGA-315LB-86	80/110	742/991	154/197	DS 5/4	2.6/1.6	6.8/6.5	6	1165
ANGA-355MB-86*	115/150	741/991	220/265	HS 2	1.6/1.3	5.2/6.2	10	1520
ANGA-355LB-86*	140/180	741/991	265/320	HS 2	1.6/1.4	5.4/6.8	12	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: AVGA****Number of poles: 4 / 2 Fan design**

Type	Rated output	Rated speed	Rated current	Rotor class	Starting torque	Starting current	Moment of inertia	Net weight
			at 400V		with direct-on starting as a multiple of the rated torque	with direct-on starting as a multiple of the rated current	J	
	kW	min <sup>-1</sup>	A				kg m <sup>2</sup>	approx. kg

**Pole-changing for 2 speeds with 1 Dahlander-connected winding,  
Design for fan drive****Speed 1500/3000 min<sup>-1</sup>**

AVGA-090LB-42	0.5/2	1440/2860	1.2/4.6	HS 4	2.4/2.2	6.0/6.0	0.0036	22
AVGA-100LB-42	0.65/2.4	1430/2870	1.45/5.0	HS 4	1.8/2.0	6.0/5.8	0.005	25
AVGA-100LD-42	0.8/3	1440/2870	1.8/6.9	HS 5	2.1/2.1	6.0/5.8	0.0066	35
AVGA-112MB-42	1.1/4.1	1420/2895	2.2/8.1	HS 4	1.7/2.0	5.3/6.7	0.011	38
AVGA-132SB-42	1.6/6	1450/2925	3.35/12	HS 4	1.9/2.2	6.5/7.5	0.022	59
AVGA-132MB-42	2.2/9	1450/2920	4.5/17.3	HS 5	2.2/2.1	6.8/7.6	0.03	69
AVGA-160MB-42	3/12	1460/2900	5.9/23	HS 4	1.8/2.3	4.9/6.1	0.068	108
AVGA-160LB-42	4/16	1465/2930	8.5/31	HS 5	2.7/2.9	5.8/8.0	0.092	130
AVGA-180MB-42	5.5/20	1470/2950	10.5/38	HS 5	2.4/2.4	5.8/6.8	0.13	162
AVGA-180LB-42*	6.3/25	1465/2935	12/46	DS 4	2.4/2.6	5.3/7.0	0.16	176
AVGA-200LG-42	8.5/33	1470/2960	16.2/61	DS 4	2.0/2.3	5.7/6.8	0.25	254
AVGA-225SE-42	10.5/38	1475/2965	19.5/70	HS 5	2.9/3.0	6.4/7.9	0.34	305
AVGA-225ME-42	13/46	1480/2970	23.5/84	HS 5	2.4/2.8	6.8/7.9	0.41	335
AVGA-250ME-42	15/55	1470/2950	29/98	HS 4/5	2.1/2.4	5.2/7.0	0.79	425
AVGA-280SG-42	20/75	1480/2965	36/125	HS 3/4	1.6/2.0	5.3/7.0	1.3	575
AVGA-280MG-42	24/90	1480/2970	44/149	HS 4	1.9/2.2	5.6/7.5	1.66	650
AVGA-315SB-42 <sup>1</sup>	27/110	1485/2980	52/179	HS 3	1.4/1.3	5.0/6.2	1.8	795
AVGA-315MB-42 <sup>1</sup>	33/132	1485/2980	62/215	HS 3	1.4/1.3	5.0/6.2	2.1	890
AVGA-315MD-42 <sup>1</sup>	37/145	1485/2980	70/235	HS 3	1.5/1.4	5.2/6.8	2.5	960
AVGA-315LB-42 <sup>1</sup>	44/172	1485/2980	80/276	HS 3	1.3/1.2	5.6/6.8	3.0	1165
AVGA-355MB-42	50/200	1485/2985	95/335	HS 2	1.2/1.3	5.0/6.8	4.3	1520
AVGA-355LB-42	65/250	1485/2985	125/420	HS 2	1.2/1.3	5.0/6.8	5.3	1730

Higher outputs, other voltages and frequencies on request.

<sup>1</sup> Type AVGA-315

We reserve us the right to deliver foot-mounted types (AVSA) in welded design.

(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

\* Utilization to insulation class F.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: AVGA****Number of poles: 6 / 4 Fan design**

Type	Rated output	Rated speed	Rated current at 400V	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J kg m <sup>2</sup>	Net weight approx. kg
	kW	min <sup>-1</sup>	A					

**Pole-changing for 2 speeds with 2 separate windings,  
Design for fan drive****Speed 1000/1500 min<sup>-1</sup>**

AVGA-090LB-64	0.4/1.3	950/1410	1.38/3.4	HS 3/4	1.8/2.3	2.8/4.5	0.0036	22
AVGA-100LB-64	0.6/1.8	950/1410	1.85/4.2	HS 3/4	1.5/2.5	2.9/5.2	0.006	35
AVGA-100LD-64	0.75/2.4	950/1425	2.95/5.7	HS 3/4	1.5/2.2	2.8/5.2	0.007	35
AVGA-112MB-64	0.9/3	950/1445	2.3/7	HS 3/4	1.8/1.9	5.0/6.0	0.011	38
AVGA-132SB-64	1.25/4.2	965/1455	3.1/9.0	HS 3/4	1.6/2.3	4.6/6.0	0.024	59
AVGA-132MB-64	1.65/5.5	955/1460	3.7/11.2	HS 3/4	1.4/1.9	5.0/7.0	0.03	69
AVGA-160MB-64	2.2/7.5	975/1470	5.4/15.2	HS 4	2.2/2.2	5.1/6.0	0.068	108
AVGA-160MD-64	3/9	970/1470	7.1/18	HS 4	2.3/2.2	4.4/6.2	0.068	108
AVGA-160LB-64	3.5/12	985/1465	9.5/24	HS 5	2.4/2.6	5.6/6.8	0.092	130
AVGA-180MB-64	4.5/14	970/1460	11.1/26.5	HS 4	1.7/1.7	6.0/7.0	0.11	162
AVGA-180LB-64	5.5/16.5	975/1460	11.8/32	HS 4	1.8/1.6	6.2/6.0	0.13	176
AVGA-200LG-64	7/20	970/1465	13.7/35	HS 4	2.3/2.0	5.8/6.5	0.25	254
AVGA-200LJ-64	9/26	975/1465	18.6/47.5	HS 5	2.5/2.5	5.7/6.9	0.25	254
AVGA-225SE-64	10/31	985/1480	21.5/60	DS 5	2.8/3.0	6.0/6.9	0.34	305
AVGA-225ME-64	13/38	985/1480	26.6/70	DS 4/5	2.3/2.7	5.5/7.0	0.41	335
AVGA-250ME-64	17/48	985/1480	34/87	HS 5	2.3/2.4	6.2/7.5	0.79	425
AVGA-280SG-64	25/70	988/1485	45/126	HS 4	1.9/1.7	5.5/6.9	1.7	575
AVGA-280MG-64	30/82	988/1485	53/142	HS 4	1.9/1.8	5.5/6.5	2.1	650
AVGA-315SB-64	32/95	985/1485	61/168	HS 4	2.2/2.2	5.3/5.6	2.3	795
AVGA-315MB-64	37/115	985/1485	70/200	DS 4	2.2/2.0	5.3/5.6	2.8	890
AVGA-315MD-64	47/135	985/1485	89/236	DS 4	2.2/2.2	5.3/6.5	3.3	960
AVGA-315LB-64*	55/160	985/1485	105/280	DS 5	2.8/2.8	6.5/7.0	3.9	1165
AVGA-355MB-64	75/200	990/1490	140/350	HS 2	1.5/1.2	6.0/6.5	6.9	1520
AVGA-355LB-64	90/250	995/1490	165/430	HS 2	1.6/1.2	6.0/6.5	8.5	1730

Higher outputs, other voltages and frequencies on request.

1 Type AVGA-315

We reserve us the right to deliver foot-mounted types (ANSA) in welded design.

(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

\* Utilization to insulation class F.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: AVGA****Number of poles: 8 / 4 Fan design**

Type	Rated output	Rated speed	Rated current	Rotor class	Starting torque	Starting current	Moment of inertia	Net weight
			at 400V		with direct-on starting	as a multiple of the	J	
	kW	min <sup>-1</sup>	A		rated torque	rated current	kg m <sup>2</sup>	approx. kg

**Pole-changing for 2 speeds with 1 Dahlander-connected winding, Design for fan drive****Speed 750/1500 min<sup>-1</sup>**

AVGA-090LB-84	0.35/1.3	705/1440	1.55/3.6	HS 3/4	1.8/2.2	2.8/4.9	0.0036	22
AVGA-100LB-84	0.45/2	705/1420	1.7/4.8	HS 3	1.6/1.7	3.0/4.8	0.0050	35
AVGA-100LD-84	0.55/2.5	715/1430	2.1/6.1	HS 3	1.8/1.9	3.5/5.2	0.0066	35
AVGA-112MB-84	0.9/3.7	710/1450	3.6/9.2	HS 3/5	1.8/2.1	3.6/5.9	0.011	38
AVGA-132SB-84	1.3/5	720/1455	4.2/10.7	HS 3/5	1.6/2.7	3.5/6.9	0.022	59
AVGA-132MB-84	1.7/6.8	720/1460	5.2/14.3	HS 3/5	1.8/2.3	4.4/7.0	0.03	69
AVGA-160MB-84	3/10	725/1475	9.7/22.3	HS 4/5	1.9/2.8	3.5/6.6	0.068	108
AVGA-160LB-84	3.5/13	730/1475	11.8/29.5	HS 3/5	1.9/2.7	3.8/7.0	0.092	130
AVGA-180MB-84	4/16	735/1470	13.1/30	DS 4	1.9/2.3	4.6/6.0	0.13	162
AVGA-180LB-84	5/20	725/1470	13.8/39	DS 4/5	2.1/2.5	3.3/6.1	0.16	176
AVGA-200LG-84	7/28	720/1450	15.2/52	HS 4/5	2.2/2.4	4.6/6.3	0.33	254
AVGA-225SE-84	8/33	725/1465	17.4/59	DS 5	2.4/2.5	4.5/6.5	0.46	305
AVGA-225SF-84*	9.2/37	720/1460	20.5/67	HS 4	2.1/2.3	4.2/6.0	0.46	305
AVGA-225ME-84	9.5/39	730/1475	21/72	HS 4/5	2.6/3.0	5.1/7.0	0.55	335
AVGA-225MF-84*	11/44	730/1470	24/78	HS 4/5	2.6/3.0	5.0/7.5	0.41	335
AVGA-250ME-84	11/49	735/1475	23/84	HS 5	2.4/2.5	5.5/7.3	1.0	425
AVGA-280SG-84	17/68	735/1480	43.5/125	HS 4	1.7/2.0	4.0/7.3	1.3	575
AVGA-280MG-84	20/80	740/1485	48/140	HS 3/4	1.7/2.0	4.1/7.5	1.6	650
AVGA-315SB-84	22/95	740/1485	45/163	HS 3/5	1.6/1.8	4.9/7.0	3.4	780
AVGA-315MB-84*	26/115	740/1485	52/196	HS 3/4	1.5/1.8	4.4/6.8	4.0	875
AVGA-315MD-84	30/132	740/1485	60/221	HS 3/4	1.5/1.9	4.7/6.8	4.8	940
AVGA-315LB-84*	38/165	740/1490	74/276	HS 3/4	1.6/2.0	4.8/6.9	6.0	1145
AVGA-355MB-84	50/220	740/1490	100/370	HS 2	1.3/1.3	4.2/6.2	10	1560
AVGA-355LB-84	60/275	740/1490	120/460	HS 3	1.4/1.4	4.5/6.7	12	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: AVGA****Number of poles: 8 / 6 Fan design**

Type	Rated output	Rated speed	Rated current at 400V	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J kg m <sup>2</sup>	Net weight approx. kg
	kW	min <sup>-1</sup>	A					

**Pole-changing for 2 speeds with 2 separate windings,  
Design for fan drive****Speed 750/1000 min<sup>-1</sup>**

AVGA-090LB-86	0.32/0.75	695/940	1.5/2.95	HS 3	1.9/1.8	2.5/3.2	0.0036	22
AVGA-100LB-86	0.45/1	720/960	1.7/3.0	HS 3	1.8/1.6	3.5/4.1	0.0086	35
AVGA-100LD-86	0.55/1.3	720/965	2.4/4.5	HS 3	1.5/2.1	3.0/4.1	0.01	35
AVGA-112MB-86	0.8/1.9	725/965	3.1/5.6	HS 3	1.6/1.9	3.7/4.9	0.017	38
AVGA-132SB-86	1.1/2.6	720/970	3.3/6.9	HS 3/4	1.3/2.0	3.8/6.1	0.033	59
AVGA-132MB-86	1.6/3.8	710/965	5/10	HS 5	2.6/2.8	3.3/5.3	0.045	72
AVGA-160MB-86	2.5/6	720/965	6.1/12.6	HS 4	2.4/1.8	6.2/6.4	0.094	108
AVGA-160LB-86	3.5/8	730/970	8.9/16.9	HS 4	2.0/1.9	6.0/6.3	0.127	130
AVGA-180LB-86	5.5/12.5	730/970	14.2/27	HS 3	1.7/1.5	4.7/5.1	0.19	176
AVGA-200LG-86	9.5/20	730/975	21/42	HS 4	2.4/2.5	5.2/6.2	0.33	282
AVGA-225SE-86	11/24	730/980	24/55	HS 4	2.3/2.7	4.9/6.2	0.46	305
AVGA-225ME-86	13/28	730/980	27/54	HS 4/5	2.3/2.5	4.8/6.2	0.55	315
AVGA-250ME-86	16/34	735/985	31/62	HS 3	1.8/1.7	5.5/6.5	1.0	420
AVGA-280SG-86	25/50	740/990	50/96	HS 4	2.1/1.8	5.5/6.0	1.7	605
AVGA-280MG-86	30/60	740/990	60/115	HS 4	2.1/1.9	5.9/6.0	2.06	670
AVGA-315SB-86	33/70	742/990	65/126	DS 4	2.5/1.6	6.7/6.1	3.38	795
AVGA-315MB-86	40/85	742/990	78/152	DS 4	2.7/1.6	6.9/6.3	4.06	890
AVGA-315MD-86	47/100	741/990	90/180	DS 4	2.4/1.6	6.6/6.1	4.84	960
AVGA-315LB-86	55/120	742/990	105/214	DS 4	2.6/1.6	6.9/6.5	6.0	1165
AVGA-355MB-86	70/150	741/991	135/265	HS 2	1.5/1.2	5.4/6.0	10	1520
AVGA-355LB-86	85/190	741/991	160/335	HS 2	1.5/1.4	5.8/6.3	12	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: ANGA****Number of poles: 8 / 6 / 4**

Type	Rated output	Rated speed	Rated current at 400V	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J kg m <sup>2</sup>	Net weight approx. kg
	kW	min <sup>-1</sup>	A					

**Pole-changing for 3 speeds with 2 separate windings,  
one of which is Dahlander-connected****Speed 750/1000/1500 min<sup>-1</sup>**

ANGA-100LB-33	0.5/0.6/0.8	715/970/1455	1.9/2.2/2.0	HS 3	1.7/2.0/1.6	2.9/3.9/4.7	0.0086	35
ANGA-100LD-33	0.7/0.8/1.1	715/975/1460	2.8/3.2/2.95	HS 3	1.6/2.0/1.5	2.9/3.9/4.7	0.01	35
ANGA-112MB-33	0.9/1.1/1.5	700/960/1455	3.5/3.7/3.6	HS 3	1.7/1.5/1.4	3.4/4.1/5.5	0.0117	38
ANGA-132SB-33	1.3/1.6/2.2	720/975/1460	3.9/4.6/4.8	HS 4	1.9/2.0/1.8	3.7/4.5/6.0	0.033	59
ANGA-132MB-33	2.2/2.5/3.6	705/960/1445	7/7/7.6	HS 4	2.3/2.0/2.3	3.9/5.1/6.4	0.045	72
ANGA-160MB-33	3.3/4/5.5	725/975/1450	7.5/8.4/10.5	HS 4	2.1/2.0/1.6	5.8/5.9/6.3	0.094	108
ANGA-160LB-33	4.5/6/8	725/975/1455	10/12.2/14.5	HS 4	2.2/1.6/1.6	6.1/6.2/6.7	0.13	130
ANGA-180MB-33	6/8/11	725/975/1460	16/20/21	HS 4	2.1/1.9/1.4	6.2/6.5/6.2	0.16	162
ANGA-180LB-33	7/9/14	730/980/1460	17.6/22/25.5	HS 4	2.3/2.0/1.4	6.4/6.8/6.2	0.19	176
ANGA-200LG-33	12/15/18.5	730/960/1450	27/32.5/33	DS 4	2.5/1.8/2.2	4.7/5.1/6.2	0.33	262
ANGA-225SE-33	16/20/26	725/980/1465	40/42.8/46.5	DS 4	2.5/2.2/2.2	5.0/6.1/6.5	0.46	305
ANGA-225ME-33*	19/22/30	725/980/1460	41/44/52	DS 4	2.5/2.3/2.0	5.1/6.3/6.2	0.55	315
ANGA-250ME-33	24/28/36	735/990/1480	50/57/62	DS 4	2.6/2.4/2.3	5.5/6.6/6.8	1.1	420
ANGA-280SG-33	31/37/50	740/990/1480	65/70/84	DS 4	1.8/1.4/1.6	5.0/5.5/6.4	1.73	605
ANGA-280MG-33	37/45/60	740/990/1480	80/87/102	DS 4	2.0/1.7/1.9	5.1/5.7/6.5	2.1	670
ANGA-315SB-33	43/55/68	740/990/1480	92/106/114	HS 3	1.5/1.5/1.5	5.5/6.3/6.9	4.2	795
ANGA-315MB-33	50/65/80	740/990/1480	100/123/133	HS 3	1.5/1.3/1.4	5.5/6.4/6.9	4.2	890
ANGA-315MD-33	60/75/95	740/990/1480	125/143/157	HS 3	1.5/1.3/1.4	5.6/6.5/7.0	4.7	960
ANGA-315LB-33	70/90/110	740/990/1485	150/171/181	HS 3	1.5/1.3/1.4	5.7/6.6/7.0	5.9	1165

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.



**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: AVGA****Number of poles: 8 / 6 / 4    Fan design**

Type	Rated output	Rated speed	Rated current at 400V	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J kg m <sup>2</sup>	Net weight approx. kg
	kW	min <sup>-1</sup>	A					

**Pole-changing for 3 speeds with 2 separate windings,  
one of which is Dahlander-connected, design for fan drive****Speed 750/1000/1500 min<sup>-1</sup>**

AVGA-090LB-33	0.22/0.3/1	700/950/1410	0.9/1.7/3.3	HS 3	1.8/1.8/1.7	2.5/3.0/3.5	0.0036	22
AVGA-100LB-33*	0.37/0.55/1.5	700/965/1440	2.1/2.8/4.8	HS 3	1.5/1.8/1.6	2.3/3.0/3.8	0.0051	35
AVGA-100LD-33*	0.45/0.7/1.9	710/955/1430	2.0/2.8/5.0	HS 3	1.4/1.5/1.3	2.6/3.3/4.6	0.0066	35
AVGA-112MB-33	0.6/0.85/2.4	715/980/1460	2.0/3.2/6.2	HS 3	1.6/2.1/1.6	3.2/4.2/5.1	0.0114	38
AVGA-132SB-33	0.75/1.3/3.7	730/980/1460	2.66/3.6/7.8	HS 3	1.8/1.5/1.4	4.4/5.3/6.7	0.022	59
AVGA-132MB-33	1/1.5/4.4	730/985/1470	4.2/5.8/10	HS 3	2.2/2.0/1.8	4.1/4.9/7.6	0.03	72
AVGA-160MB-33	1.6/2.2/6.6	725/980/1470	5.2/5.7/13.1	HS 4	2.0/1.9/2.0	3.6/5.1/6.5	0.068	108
AVGA-160LB-33	2.1/3.1/9	730/980/1470	6.7/8.1/17.6	HS 4	2.3/2.1/2.3	4.1/5.6/8.1	0.092	130
AVGA-180MB-33	3/4.5/13	725/985/1455	6.4/11.5/25	HS 4	1.9/1.9/1.9	5.2/6.4/6.5	0.158	162
AVGA-180LB-33	3.7/5.5/16	720/985/1455	8.4/15.7/32	HS 4	2.0/2.0/2.9	5.3/6.9/7.1	0.19	176
AVGA-200LG-33	5/7/20	725/980/1465	10.5/14.3/38	HS 4	2.3/1.8/2.6	5.2/6.0/6.7	0.33	262
AVGA-225SE-33	6/9/27	730/985/1470	12.8/19.5/47.5	HS 5	2.7/2.0/2.7	5.6/6.8/7.0	0.46	305
AVGA-225ME-33	7/10.5/32	735/985/1470	15.2/23.8/59	HS 5	2.7/1.8/2.2	5.0/5.1/6.0	0.55	315
AVGA-250ME-33	8/12/35	735/990/1475	17.1/24.7/60	HS 5	2.2/1.6/2.3	5.0/6.0/7.4	1.0	420
AVGA-280SG-33	14/21/60	740/990/1480	26.6/37/95	DS 4	1.4/1.3/1.8	4.6/5.8/7.0	1.7	605
AVGA-280MG-33	17/25/70	735/990/1480	34.2/48.5/119	DS 4	1.6/1.5/1.7	4.3/5.4/6.3	2.1	670
AVGA-315SB-33	18/26.5/75	740/990/1480	38/55/126	HS 3	1.4/1.3/1.5	5.0/5.5/7.0	4.2	795
AVGA-315MB-33	21.5/32/90	735/990/1480	41.8/62.7/150	HS 2	1.3/1.2/1.3	4.8/6.5/6.5	4.2	890
AVGA-315MD-33	25/37/105	740/990/1485	52.3/77/176	HS 2	1.3/1.3/1.6	5.2/6.5/7.5	4.7	960
AVGA-315LB-33*	31/45/132	740/990/1485	64.6/94/222	HS 2	1.3/1.2/1.5	5.5/6.8/7.6	5.9	1165

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

## Series A.../ E..., Dimension drawings

Frame size – Number of poles	Design	IM B3 IM V5 IM V6  Terminal box on top	IM B3 IM V5 IM V6  Terminal box side-mounted	IM B5 IM V1 IM V3  Terminal box on top	IM B35 IM V15 IM V36  Terminal box on top	IM B14 <sup>1</sup> IM V18 IM V19  Terminal box on top	IM B34 <sup>1</sup> IM V5/IM V18 IM V6/IM V19  Terminal box on top
090–180	Standard Noise grade 1					<b>MLA00-0026</b>	<b>MLA00-0027</b>
090–315M					<b>MLA00-0025</b>		
090–355		<b>MLA00-0023</b>	<b>MLA00-0001</b>	<b>MLA00-0024</b>			
132–355	Noise grade 3	<b>MLA00-0061</b>	<b>MLA00-0067</b>	<b>MLA00-0062</b>	<b>MLA00-0063</b>		
090–315	with cable entry (without terminal box)	<b>MLA00-0031</b>		<b>MLA00-0032</b>	<b>MLA00-0093</b>	<b>MLA00-0033</b>	
090–280	Forced ventilation axial	<b>MLA00-0034</b>		<b>MLA00-0035</b>	<b>MLA00-0036</b>		
315–355		<b>MLA00-0103</b>		<b>MLA00-0104</b>	<b>MLA00-0105</b>		
071–315	Terminal box	<b>M 143666</b>					

<sup>1</sup> In accordance with DIN EN 50347 only the flanges up to the size FT 165 standardized

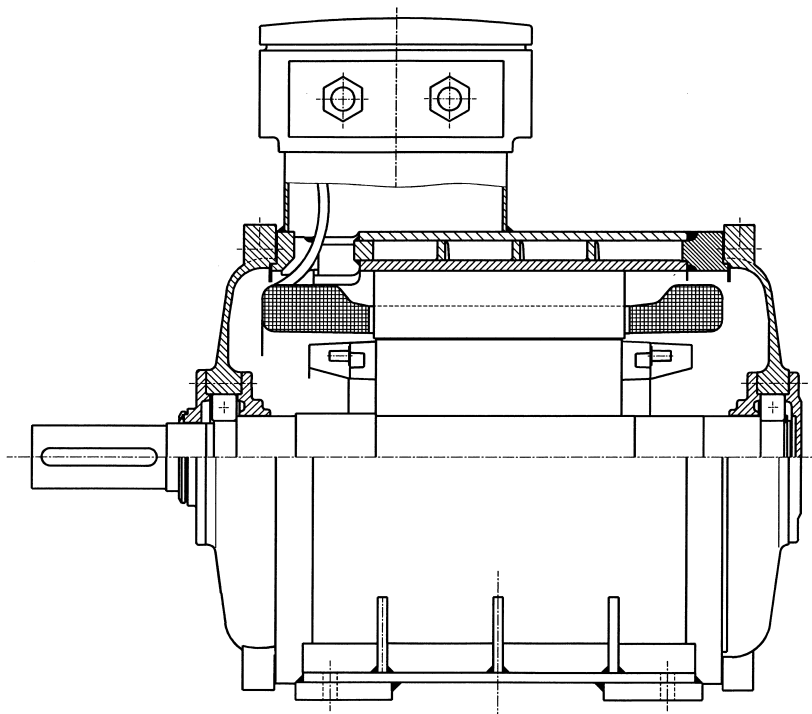
**The indicated dimension drawings are included in the Appendix of this technical list from Page 247 in ascending order.**

For the mounting types IM B3, IM B5 and IM B35 with terminal box on top the single dimension drawings are available in the output tables of the CD version (not in the printed version of this technical list).

# Water-cooled motors, Series ANWA

## Structural description

Three-phase motor, type ANWA, mounting IM B3, cooling system IC 71 W

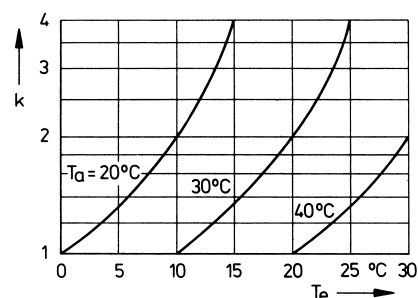


### Output

The rated outputs and operating data given in the tables are valid for duty-type S 1 according to DIN EN 60034-1 at a rated frequency of 50 Hz and the rated voltage.

### Cooling water requirement

The cooling water requirement as indicated in the tables is based on an inlet temperature of  $T_e = 20^\circ\text{C}$  and an outlet temperature of  $T_a \approx 40^\circ\text{C}$ . For other temperatures the quantity has to be multiplied by the factor  $k$  according to the diagram below, e.g.  $T_e = 20^\circ\text{C}$  and  $T_a = 30^\circ\text{C}$  result in a factor  $k = 2$ .



### General notes

The advantages of water cooling are as follows:  
Reduction of the sound pressure level compared to totally enclosed fan-cooled three-phase motors of the same output and frame size.  
The heat of the motor is well dissipated and does not influence its direct surroundings. Smaller external dimensions. Higher outputs.  
Good vibration damping.

### Construction

The motor frame with its water chambers is steel welded.  
For water cooling the jacket of the frame is designed with a double wall. The cooling water flow guarantees high-speed circulation and thus a uniform cooling.  
Bearings, terminal box, insulation of the stator winding, enclosure and painting are identical with the totally enclosed fan-cooled motors in this technical list.

### Protection against condensed water

All motors are equipped with drain holes which are closed by an enclosure-specific plug which ensures the proper draining of any condensed water.  
Damage to the winding due to the collection of water inside the winding-head areas is thus avoided.  
For extreme operating conditions, the sealing of both the terminal box and the winding-head areas with a silicon-rubber compound is recommended.

### Motor protection

As additional protection we recommend thermal motor protection by means of PTC-thermistors.

Inlet temperature of cooling water at least  $20^\circ\text{C}$ .

The quality as well as the sediment of the cooling water have to be stated in your order.  
Max. permissible sediment in the cooling water is 10 mg/l.

### Special designs

On request water-cooled three-phase motors can be additionally equipped with PTC thermistors for monitoring of the bearings, SPM detectors for vibration monitoring of the bearings, meter for cooling water flow control, space heater, reverse lock or tachometer.

## Water-cooled motors, Series ANWA, Output tables,

### Three-phase motors with squirrel cage

Water-cooled, enclosure IP 55

400V, 500V, 690V – 50 Hz

Class F insulation, Utilization to B

Types: ANWA

Number of poles: 2, 4, 6

Type	Rated output	Rated speed	Rated current at 400V	Efficiency $\eta$	Power factor $\cos\varphi$	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque starting as a multiple of the rated torque	Starting current rated current	Moment of inertia J kg m <sup>2</sup>	Cooling-water requirements <sup>1</sup> approx. l/min	Net weight approx. kg
	kW	min <sup>-1</sup>	A	%								
<b>Speed 3000 min<sup>-1</sup></b>												
ANWA-200LG-02	37	2940	64	91	0.92	DS 4	1.9	2.1	6.5	0.16	3.1	300
ANWA-200LJ-02	45	2940	79	92	0.9	DS 4	2.1	2.3	6.6	0.17	3.3	320
ANWA-225ME-02	55	2950	95	92	0.9	DS 4	1.9	2.2	6.3	0.23	4.0	410
ANWA-250ME-02	75	2955	143	92.5	0.85	DS 4	1.8	2.5	6.3	0.41	4.9	550
ANWA-280SG-02	90	2965	162	93	0.87	DS 4	1.8	1.8	6.5	0.72	5.4	660
ANWA-280MG-02	110	2970	190	94.5	0.87	DS 4	1.9	1.9	6.8	0.88	5.2	750
ANWA-315SB-02	132	2975	223	95	0.89	HS 2	1.1	2.3	6.2	1.75	5.6	990
ANWA-315MB-02	160	2975	273	95.2	0.89	HS 2	1.1	2.3	6.2	2.0	6.5	1090
ANWA-315MD-02	200	2975	340	95.5	0.89	HS 2	1.1	2.3	6.2	2.3	7.5	1140
ANWA-315LB-02	250	2985	423	95.8	0.89	HS 2	1.1	2.3	6.2	2.8	8.8	1290
ANWA-355MB-02	300	2980	506	96	0.89	HS 2	1.0	2.3	6.2	3.0	10	1550
ANWA-355LB-02	375	2980	632	96	0.9	HS 2	1.0	2.3	6.2	3.5	12.5	1780
<b>Speed 1500 min<sup>-1</sup></b>												
ANWA-200LG-04	37	1470	70	92	0.84	DS 4	2.4	2.0	6.3	0.21	2.8	300
ANWA-225SE-04	45	1475	85	92	0.83	DS 4	2.6	2.4	6.3	0.32	3.3	370
ANWA-225ME-04	55	1470	100	92.5	0.86	DS 4	2.3	2.1	6.2	0.37	3.8	410
ANWA-250ME-04	75	1475	135	93	0.86	DS 4	1.9	2.4	6.3	0.7	4.5	550
ANWA-280SG-04	90	1480	165	93.5	0.84	DS 4	2.0	1.9	7.0	1.2	5.0	660
ANWA-280MG-04	110	1480	200	94	0.84	DS 4	2.0	2.0	7.0	1.42	5.6	750
ANWA-315SB-04	132	1475	238	94.5	0.85	DS 4	1.8	2.0	6.2	2.76	6.2	990
ANWA-315MB-04	160	1480	285	94.8	0.85	DS 4	1.8	2.0	6.2	3.15	7.0	1090
ANWA-315MD-04	200	1480	352	95	0.85	DS 4	1.9	2.0	6.2	3.5	8.4	1140
ANWA-315LB-04	250	1485	437	96	0.86	HS 2	1.1	2.2	6.2	4.2	8.4	1290
ANWA-355MB-04	315	1485	551	96.1	0.86	HS 2	1.0	2.2	6.2	5.6	10.2	1550
ANWA-355LB-04	375	1485	655	96.2	0.86	HS 2	1.0	2.2	6.2	6.5	11.8	1780
<b>Speed 1000 min<sup>-1</sup></b>												
ANWA-200LG-06	22	970	42	89.5	0.84	DS 4	2.3	2.0	5.2	0.28	2.1	300
ANWA-200LJ-06	30	960	61	88	0.82	DS 4	1.9	1.7	4.5	0.28	3.3	320
ANWA-225ME-06	37	980	74	91	0.81	DS 4	2.5	2.1	5.7	0.51	3.0	410
ANWA-250ME-06	45	980	89	91.5	0.8	DS 4	2.1	2.1	6.7	0.9	3.4	550
ANWA-280SG-06	55	980	99	92.5	0.87	DS 4	2.1	2.0	6.3	1.6	3.6	660
ANWA-280MG-06	75	980	134	93	0.87	DS 4	2.1	2.0	6.4	1.9	4.5	750
ANWA-315SB-06	90	980	162	94.1	0.85	DS 4	2.1	2.1	6.0	2.5	4.5	990
ANWA-315MB-06	110	980	199	94.3	0.85	DS 4	2.1	2.1	6.2	3.0	5.3	1090
ANWA-315MC-06	132	985	237	94.5	0.85	HS 2	1.2	2.6	6.0	3.6	6.2	1140
ANWA-315MD-06	160	985	290	94.5	0.85	HS 2	1.2	2.0	6.0	3.6	7.5	1140
ANWA-315LB-06	200	990	356	95.2	0.85	HS 2	1.2	2.1	6.0	4.5	8.1	1290
ANWA-355MB-06	250	990	446	95.2	0.85	HS 2	1.0	2.0	6.0	7.8	10.1	1550
ANWA-355LB-06	315	990	570	95.2	0.85	HS 2	1.0	2.0	6.0	8.9	12.7	1780

Higher outputs, other voltages, frequencies and other output assignments to the frame sizes on request.

1 Cooling-water inlet temperature  $T_e = 20^\circ\text{C}$ .

**Three-phase motors with squirrel cage**

Water-cooled, enclosure IP 55

400V, 500V, 690V – 50 Hz

Class F insulation, Utilization to B

**Types: ANWA****Number of poles: 8**

Type	Rated output	Rated speed	Rated current at 400V	Efficiency $\eta$	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque starting as a multiple of the rated torque	Starting current	Moment of inertia J	Cooling-water requirements <sup>1</sup>	Net weight
	kW	min <sup>-1</sup>	A	%	cos $\varphi$				rated current	kg m <sup>2</sup>	approx. l/min	approx. kg
<b>Speed 750 min<sup>-1</sup></b>												
ANWA-200LG-08	18.5	715	38	86.5	0.81	DS 4	1.9	1.7	4.2	0.28	2.3	300
ANWA-225SE-08	22	720	47	87	0.78	DS 4	2.1	1.9	4.2	0.45	2.6	370
ANWA-225ME-08	30	725	64	88.5	0.75	DS 4	2.0	1.8	4.0	0.52	3.1	410
ANWA-250ME-08	37	725	77	89	0.78	DS 4	2.1	1.9	4.3	0.9	3.7	550
ANWA-280SG-08	45	730	88	92	0.8	DS 4	2.0	1.8	5.3	1.6	3.2	660
ANWA-280MG-08	55	735	108	92	0.8	DS 4	2.1	1.9	5.3	1.9	3.8	750
ANWA-315SB-08	75	735	142	93	0.82	DS 4	2.1	2.1	5.8	2.7	4.5	990
ANWA-315MB-08	90	735	171	93.2	0.82	DS 4	2.1	2.0	5.8	3.2	5.3	1090
ANWA-315MC-08	110	730	204	93.7	0.83	HS 2	1.0	2.0	5.5	4.7	5.9	1140
ANWA-315MD-08	132	730	244	94	0.83	HS 2	1.0	2.0	5.5	4.7	6.7	1140
ANWA-315LB-08	160	730	294	94	0.83	HS 2	1.0	2.0	5.5	6.0	8.2	1290
ANWA-355MB-08	200	730	366	94.5	0.83	HS 2	1.0	2.0	5.5	12.4	9.3	1550
ANWA-355LB-08	250	730	459	94.6	0.83	HS 2	1.0	2.0	5.5	14.7	11.4	1780

Higher outputs, other voltages, frequencies and other output assignments to the frame sizes upon request.

<sup>1</sup> Cooling-water inlet temperature  $T_e = 20^\circ\text{C}$ .**Series ANWA, Dimension drawings**

Frame size	IM B3	IM B5, IM V1, IM V3
200	<b>MLA00-0037</b>	<b>MLA00-0038</b>
225		
250		
280		
315		
355		

The indicated dimension drawings are included in the Appendix of this technical list from Page 247 in ascending order.

# Brake motors, Series ABGA

Frame sizes 090–225, cast iron frame

## Mechanical construction

### Brake torque 32 to 400 Nm

Modern manufacturing technology made the brake motor to be a special driving component in engineering technology. Higher working speeds at switching operation simultaneously with a reduction of non-productive waiting times are required for rationalization of driven machines. The brake motor allows short stopping times of the rotating masses even at a high switching frequency. Another important field of application of the brake motors is the holding of loads and restoring torques. Our brake motor consists of a three-phase asynchronous motor which is connected with one brake as a unit. With its compact design the brake motor is an ideal component in drive technology wherever possibly short stalling times are required. At the same time the known advantages of the three-phase asynchronous motor with squirrel cage are still given. This brake motor is suitable for various braking problems. It can also be used for switching operation at a high switching frequency, high deceleration accuracy and long service life as well as a power brake motor with a high working capacity. The brake motor is also perfectly suitable to drive hoisting units and travelling equipment.

### Special features of the spring-loaded single-disk brake

- Brakes comply with the DIN VDE 0580 standard
- Holding brake due to spring pressure actuation
- Microswitch for air gap control as option (from brake size 12)
- Brake torque active in currentless condition (closed circuit brake)
- Robust and simple design
- High operational safety due to long service life
- Brakes are designed for Class F insulation
- Large working air gap makes an automatic readjustment unnecessary
- In case of an extremely high wear the working air gap is easily readjustable
- Brake torque adjustment between 100% and approx. 60% possible
- Manual release with automatic restoring mechanism
- Corrosion-proof brakes  
Asbestosfree friction linings
- Brakes are designed for a 100% duty cycle

Detailed description also see "Electrical connection".

The standard voltages for the brake coils are: 24V, 103V, 180V, 205V +5% –10%. Ratio brake control voltage/type of rectifier/brake coil voltage see "Connection diagrams".

# Spring-loaded single-disk brake

Electrical connection  
Operating times  
Connection diagram

## Electrical connection

In addition to the motor terminals the terminal box also includes a bridge-connected rectifier for the usual 230V ~ brake control voltage. For higher brake control voltages a single-way rectifier with zero diodes can be fitted, or the connection has to be made via an intermediate transformer which, however, is not part of our delivery. In cases where the operational voltage of the motor is different from the brake control voltage, a separate brake control voltage has to be supplied by an additional terminal.

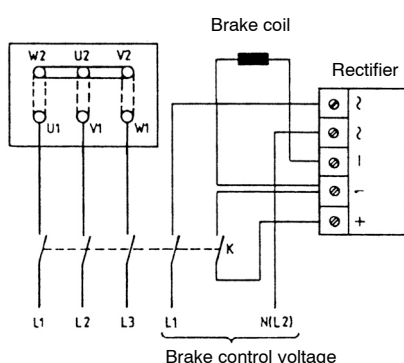
## Brake operating times

The operating times can be taken from the opposite table and are also shown in the diagram.

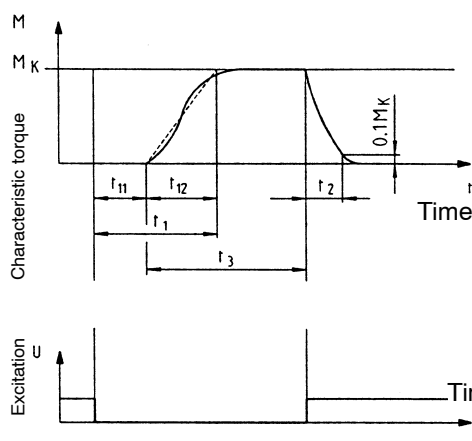
- AC-side switching: Extended switching-on time (delayed brake response). The switching-off time is the same as for DC-side switching.
- DC-side switching: Short operating time, short switching-on time (fast brake response).

## Connection diagram for brake motor with spring-loaded disk brake

- Brake connected for alternating current.  
(as supplied)



Torque-time characteristic depending on the excitation voltage:



- $t_{11}$  = Delayed response for switching  
 $t_{12}$  = Rise time of the brake torque  
 $t_1$  = Switching-on time  
 $t_2$  = Switching-off time  
 $t_3$  = Slipping time

The following operating times will result:

Brake size	Brake characteristic torque at $M_K^1$ [Nm]	Max. permissible switching at unique connection $Q_E$ [J]	Transition switching frequency $S_{H\bar{U}}$ [h <sup>-1</sup> ]	Operating times at $S_{H\bar{U}Rated}$			
				Switching-on direct current		Switching-off	
				$t_{11}$	$t_{12}$	$t_1$	$t_2$
12	32	24000	30	28	25	53	115
14	60	30000	28	17	25	42	210
16	80	36000	27	27	30	57	220
18	150	36000	20	33	45	78	270
20	260	80000	19	65	100	165	340
25	400	120000	15	110	120	230	390

<sup>1</sup> Minimum brake torque at run-in friction elements.

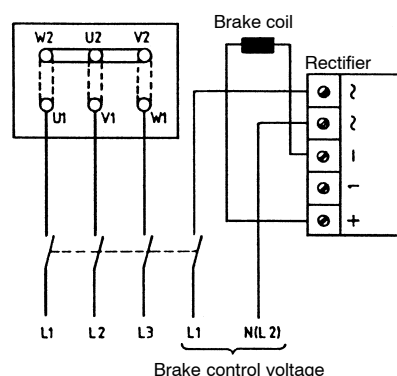
The times mentioned in the table are for DC-side switching.

In case of AC-side switching the  $t_1$ -values for the brakes will be higher by about 6 times.

## Please observe the control voltage of the brake on the rating plate.

- Brake connected for direct and alternating current.  
(Additional switch contact K necessary; reconnect brake connection cable from + to 1)

Alternating voltage (Brake control voltage)	Type of rectifier	Direct current voltage brake coils
230V	Bridge	205V
400V	Single-way	180V



Motors of this technical list which are designed for the rated voltage range acc. to DIN IEC 60038 (e.g. 380V–420V,  $\pm 5\%$ ) are equipped with brakes, meeting the requirements of this voltage range.

## Spring-loaded single-disk brake

### Technical data of the brake Torque adjustment

**Operating location**  
as required.

**Pole-changing brake motors**  
on request.

**Corrosion protection**  
The brakes are protected against corrosion.

**Brake motors**  
with increased switching frequency on request.

#### Allocation of the characteristic torque to the motor size

	$M_K$ [Nm]
Frame size 090	16
Frame size 090	32
Frame size 100	32
Frame size 112	32
Frame size 112	60
Frame size 132	80
Frame size 132; 160	150
Frame size 160; 180; 200	260
Frame size 180; 200; 225	400

#### Technical data of the brake

Brake size	10	12	14	16	18	20	25
Characteristic torque $M_K$ [Nm] <sup>1</sup>	16	32	60	80	150	260	400
Brake torque in % at 1500 [min <sup>-1</sup> ]	83	81	80	79	77	75	73
at 3000 [min <sup>-1</sup> ]	76	74	73	72	70	68	68
max. speed [min <sup>-1</sup> ]	3000	3000	3000	3000	3000	1500	1500
Power input $P_{20^\circ\text{C}}$ [Watt]	30	40	50	55	85	100	110
Mass [kg]	2.5	3.5	5.2	7.9	12	19.3	29.1
Moment of inertia $J$ [kg m <sup>2</sup> ]	0.0002	0.00045	0.00063	0.0015	0.0029	0.0073	0.02
max. air gap adjustment [mm]	1.5	2.0	2.5	3.5	3.0	4.0	4.5
min. brake rotor thickness [mm]	7.5	8.0	7.5	8.0	10.0	12.0	15.5
max. perm. switching per operation WE [KJ]	12	24	30	36	60	80	120
Switchability up to 0.1 mm friction $W_R$ 0.1 [Nm]	on request						
Operating air gap [mm] min. max.	0.3 0.75	0.3 0.75	0.3 0.75	0.3 0.75	0.4 1.0	0.4 1.0	0.5 1.25

<sup>1</sup> See output tables for possible allocation to motor frame sizes.

<sup>2</sup> Rotating parts of the brake

The brake coil has normally a supply voltage of 205V–. Further standard voltages for the coil are 24V–, 103V– and 180V–. Other supply voltages against surcharge. Voltage tolerance  $\pm 10\%$  acc. to DIN VDE 0580/ DIN IEC 60038.

#### Torque adjustment

The rotor with brake linings is connected by the toothed hub to the motor shaft. In currentless condition the compression springs are pressing the armature disk against the rotor. This pressure generates the brake torque.

The transmissible brake torque is changed by modifying the spring load.

The brake is provided with an adjustment ring. By turning of the adjustment ring the spring load and consequently the brake torque can be changed. Compression springs are guided by pressure bolts.



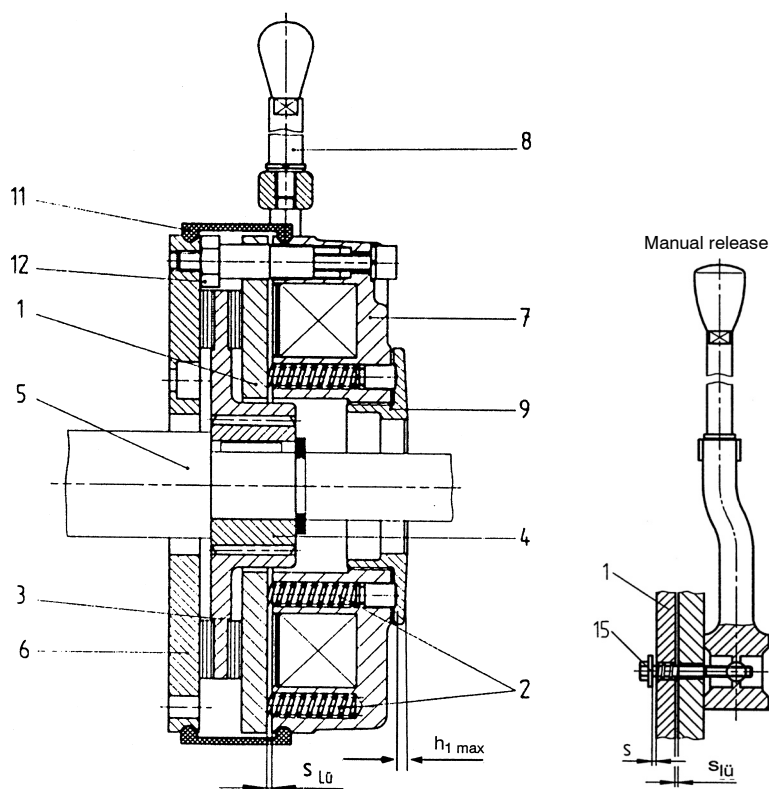
## Brake with manual release

### Noise behaviour

#### Brake with manual release

Optionally the brake is available with manual release. Pulling the hand release lever in de-energized state causes the armature disk to be drawn over the tension bolts against the compression springs in the magnet unit, resulting in an air gap between rotor and armature disk. Thus the brake is mechanically released and the shaft is easily rotatable. During operation the hand release lever is kept in its normal position by the compression spring on the tension bolt.

- 1 Armature disk
- 2 Compression spring
- 3 Rotor
- 4 Toothed hub
- 5 Shaft
- 6 Intermediate flange
- 7 Magnet unit
- 8 Manual release
- 9 Adjustment ring
- 11 Cover ring
- 12 Sleeve bolt



Air gap "s" is the distance between the armature disk (1) and the washer (15). Dimension "s" must be observed for mounting of the manual releases:

Brake size	$s_{Lü}$ (mm)	$s^{+0.1}$ (mm)	
12	0.3	1.5	Service brake ( $s_{Lümax}$ appr. $2.5 \times s_{Lü}$ )
14			
16			
18	0.4	2	Holding brake with emergency stop operation ( $s_{Lümax}$ appr. $1.5 \times s_{Lü}$ )
20			
25	0.5	2.5	

Attention:

Also with a reduced characteristic torque the adjustment of the air gap is to be readjusted for safety reasons when dimension  $s_{Lümax}$  is reached.

#### Noise behaviour

During operation the noise behaviour of the brake motor is not influenced by the brake. The sound pressure level is indicated in the noise data tables for three-phase motors without brake (see page 17). However, abrupt noises are caused at release or disengagement of the brake. These can be measured using the A-rated pulse sound pressure level according to DIN EN ISO 1680 (see table).

Brake size	A-pulse sound pressure level $L_{A1}$ (approximate values)
132	76 dB (A)
160	80 dB (A)
180, 200, 225	83 dB (A)

## Basis of calculation

A brake is essentially designed in accordance with the required brake torque  $M_{req}$ . The masses to be decelerated (moments of inertia), the relative speeds as well as the switching frequencies must be included into the calculations. Marginal conditions, like e.g. ambient temperature, air humidity, dust load etc. and installation position should be known. For extreme/critical application conditions it is necessary to consult the manufacturer.

Design is to be made under consideration of the VDI directives 2241.

**The friction surfaces must always be free from oil and grease.**

### Safety factor

In order to obtain the required transmission safety even at extreme operational conditions, the calculated brake torque should include the safety factor  $K$  the size of which is to be chosen depending on the operational conditions.

$$K \geq 2$$

### Load types

In practical application the following load types occur in most cases:

$$M_{req} = M_a \cdot K \leq M_K$$

$$M_a = \frac{J_L \cdot \Delta n_0}{9.55 \cdot \left(t_3 - \frac{t_{12}}{2}\right)}$$

$$M_{req} = \frac{J_L \cdot \Delta n_0}{9.55 \cdot \left(t_3 - \frac{t_{12}}{2}\right)} \cdot K$$

### Dynamic and static load

In most of the application cases a mixed load is concerned, since a dynamic load has to be added to the static load torque.

$$M_{req} = (M_a \pm M_L) \cdot K \leq M_K$$

$$M_{req} = \left[ \frac{J_L \cdot \Delta n_0}{9.55 \cdot \left(t_3 - \frac{t_{12}}{2}\right)} \pm M_L \right] \cdot K \leq M_K$$

+  $M_L$  = to be applied e.g. when a load is decreased

–  $M_L$  = for a normal braking operation

### Rough determination of the required brake torque

#### and the frame size respectively:

If only the input power to be transmitted is known, the required torque or brake torque can be determined as follows:

$$M_{req} = 9550 \frac{P}{\Delta n_0} \cdot K \leq M_K$$

### Thermal load

If high switching frequencies and frictional work/switching cycle are to be expected it is recommended to check the thermal calculation of the brake.

The frictional work per switching cycle is calculated from:

$$Q = \frac{J_L \cdot \Delta n_0^2}{182.5} \cdot \frac{M_K}{M_K \pm M_L}$$

–  $M_L$  = to be applied e.g. when a load is decreased

+  $M_L$  = for a normal braking operation

The permissible frictional work per switching cycle at given switching frequency is indicated in the diagram on page 95. If the frictional work per switching cycle is known the permissible switching frequency can be taken from the aforementioned diagram.

## Basis of calculation

### Applied symbols and definitions:

**P** [kW] Input power

**M<sub>K</sub>** [Nm] Characteristic torque of the brake

**M<sub>L</sub>** [Nm] Load torque

**M<sub>req</sub>** [Nm] Required brake torque

**M<sub>a</sub>** [Nm] Retarding torque

**Δn<sub>0</sub>** [min<sup>-1</sup>] Initial relative speed of the brake

**J<sub>L</sub>** [kgm<sup>2</sup>] Mass moment of inertia of all drive components reduced to the shaft to be decelerated

**t<sub>1</sub>** [s] Switching-on time,  $t_1 = t_{11} + t_{12}$

**t<sub>2</sub>** [s] Switching-off time (time from the beginning of the torque decrease until 0.1 M<sub>K</sub> is reached)

**t<sub>3</sub>** [s] Slipping time  
(time during which a relative movement between input and output occurs with the closed brake)  
This time depends on the application e.g. switching frequency, required deceleration ...

**t<sub>11</sub>** [s] Delayed response for switching  
(time from disconnection of the voltage until the beginning of the torque increase)

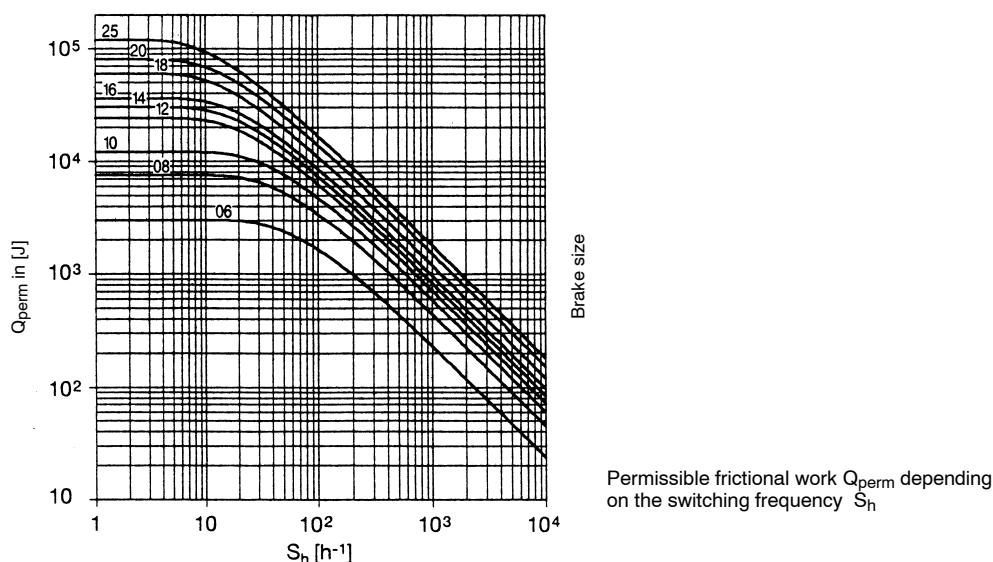
**t<sub>12</sub>** [s] Rise time of the brake torque

**K** Safety factor

**Q** [J] Calculated frictional work per switching cycle

**Q<sub>perm</sub>** [J] Max. permissible frictional work per switching cycle

**S<sub>h</sub>** [h<sup>-1</sup>] Switching frequency, i.e. the number of braking operations regularly distributed over the unit of time



## Example

### Example

The following technical data are known:

$$\begin{aligned} P &= 3 \text{ kW} \\ \Delta n_0 &= 1450 \text{ min}^{-1} \\ J_L &= 0.52 \text{ kgm}^2 \text{ total} \\ t_3 &= 2 \text{ s} \\ M_L &= 15 \text{ Nm} \\ S_h &= 6 \text{ operations/h} \end{aligned}$$

Rough determinations of the required brake torque and the frame size respectively:

$$M_{req} = 9550 \frac{P}{\Delta n_0} \cdot K$$

$$M_{req} = 9550 \frac{3}{1450} \cdot 2 = 40 \text{ Nm}$$

Preliminarily selected brake size 14

Determination of the required brake torque

$$M_{req} = \left[ \frac{J_L \cdot \Delta n_0}{9.55 \cdot \left( t_3 - \frac{t_{12}}{2} \right)} - M_L \right] \cdot K$$

$$t_{12} = 0.025 \text{ s (see Page 91)}$$

$$M_{req} = \left( \frac{0.52 \cdot 1450}{9.55 \cdot \left( 2 - \frac{0.025}{2} \right)} - 15 \right) \cdot 2 = 54.85 \text{ Nm}$$

Therefore brake size 14 is selected

$$M_K = 60 \text{ Nm} > M_{req} = 55 \text{ Nm}$$

### Checking of thermal calculation

$$Q = \frac{J_L \cdot \Delta n_0^2}{182.5} \cdot \frac{M_K}{M_K \pm M_L}$$

$$Q = \frac{0.52 \cdot 1450^2}{182.5} \cdot \frac{60}{(60 + 15)} = 4792 \text{ J}$$

Calculated switching  $Q = 4792 \text{ J}$  / switching cycle.  
From the diagram on page 95 results for the brake size 14 at  $S_h = 6 \text{ h}^{-1}$  a permissible switching of 30000 J.

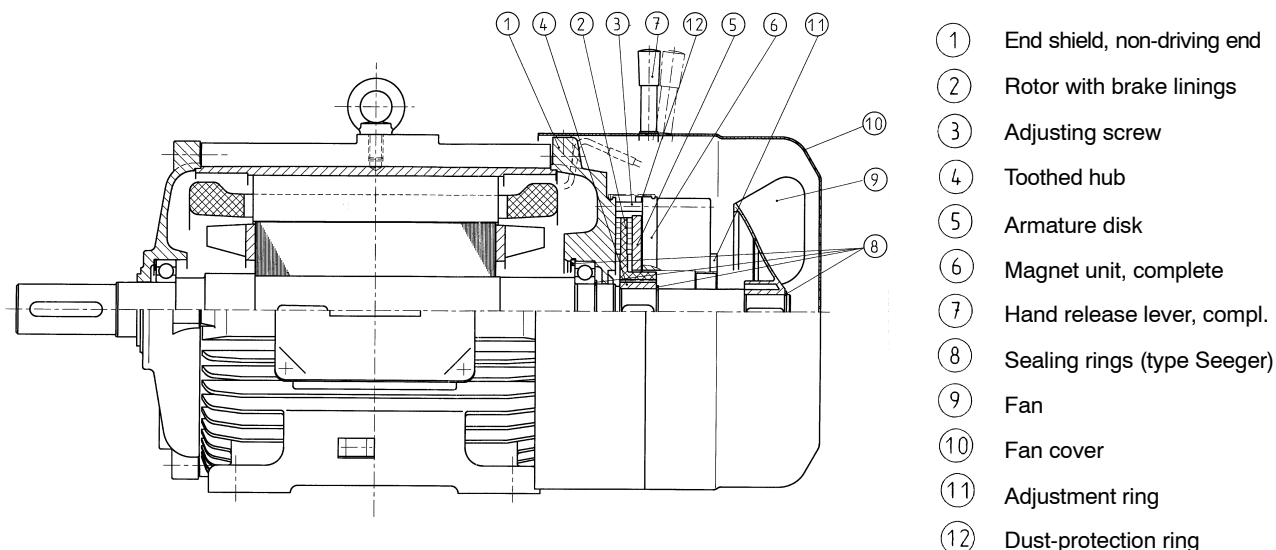
$$Q = 4792 \text{ J} < Q_{perm} = 30000 \text{ J}$$

The brake is correctly designed.

**Three-phase brake motors with squirrel cage**  
**Sectional view**  
**Design**  
**Antifriction bearings**

**Sectional view**

**Brake motor Type ABGA-200 with spring-loaded single-disk brake**



**Design**

The surface-cooled brake motors are equipped with a spring-loaded single-disk brake with two asbestosfree lining surfaces. For this purpose the end shield on the non-driving end is especially designed and made of grey-cast iron. The bearing sizes are indicated in the table. As regards the other mechanical features the brake motors are identical with the totally enclosed fan-cooled three-phase motors.

The brakes and fans of the motors included in this catalogue are suitable for both directions of rotation.

The enclosure of the motor is IP 55. Other enclosures are possible on request. Upon special request the brake is supplied with hand release lever in order to turn the shaft even in de-energized state.

All brakes are delivered with torque adjustment.

The spring-loaded brake is an electro-magnetic device for dry running, for which the power of an electro-magnetic field is utilized to release the braking effect generated by the spring load. The spring-loaded brake is decelerating in de-energized state and releases under current.

The brake motors distinguish by the following characteristics: Short switching times, high operational safety, convenient dimensions, little space requirement, low moment of inertia.

The main fields of application are: Load braking, deceleration of inertia masses, reduction of coasting times, emergency braking, precision adjustment.

Brake motors with higher outputs, other voltages, frequencies and number of poles as determined in the output tables as well as in pole-changing design can also be supplied.

**Antifriction bearings**

Frame size	Number of poles	DE-bearing	NDE-bearing	Grease life with permanent lubrication in operating hours at rated speed:		Grease quantity in grammes per bearing Grease filling for permanent lubrication
				3000 min <sup>-1</sup>	1500 to 750 min <sup>-1</sup>	
090	2-8	6205-2Z C3	6205-2Z C3	24000	33000	11
100	2-8	6206-2Z C3	6206-2Z C3	24000	33000	15
112	2-8	6306-2Z C3	6206-2Z C3	33000	33000	25
132	2-8	6308-2Z C3	6208-2Z C3	24000	33000	50
160	2-8	6309-2Z C3	6210-2Z C3	24000	33000	70
180	4-8	6310-2Z C3	6210-2Z C3	24000	33000	80
200	4-8	6212-2Z C3	6212-2Z C3	24000	33000	60
225	4-8	6213 C3	6213 C3	17000	33000	70

The indicated grease life is applicable for an ambient temperature of max. 40°C.  
 For every 15°C temperature rise, the lubrication time is to be reduced by half of the value indicated in the table.  
**Twice the grease life can be expected at an ambient temperature of ≤ 25°C, however 33 000 h at a maximum.**

## Special designs

### Three-phase brake motors with squirrel cage

Frame size	090	100	112	112	132	160	180	200	225
Mounting types IM B6, IM B7, IM B8, IM B9, IM B15, IM V5, IM V6, IM V8, IM V9	○	○	○	○	○	○	○	○	○
IM B5	●	●	●	●	●	●	●	●	●
IM B35, IM V1, IM V3	●	●	●	●	●	●	●	●	●
IM B34, IM B14, IM V18, IM V19 <sup>1</sup>	●	●	●	●	●	●	●	A	A
Protective cover for IM V1, IM V5, IM V8, IM V10, IM V18	●	●	●	●	●	●	●	●	●
Enclosure IP 56	●	●	●	●	●	●	●	●	●
Radial shaft sealing ring at driving end	●	●	●	●	●	●	●	●	●
Labyrinth ring for external bearing sealing	N	N	N	N	N	N	N	N	N
Fixed bearing at driving end	●	●	●	●	●	●	●	●	●
Fixed bearing at non-driving end	○	○	○	○	○	○	○	○	○
Reinforced bearing (roller bearing at driving end)	N	N	N	N	N	●	●	●	●
Flange with tolerance R (reduced) acc. to DIN 42955	●	●	●	●	●	●	●	●	●
Fan made of aluminium alloy	●	●	●	●	●	●	●	N	N
Forced ventilation	●	●	●	●	●	●	●	●	●
Second standard shaft end (reduced)	●	●	●	●	●	●	●	●	●
Non-standard shaft end	●	●	●	●	●	●	●	●	●
Non-standard flange	●	●	●	●	●	●	●	●	●
Non-standard voltage and/or frequency	●	●	●	●	●	●	●	●	●
Dual voltage design	A	A	A	A	A	A	A	A	A
Built-in PTC thermistors	●	●	●	●	●	●	●	●	●
Built-in space heater	●	●	●	●	●	●	●	●	●
SPM-nipples or SPM-detectors installed	N	N	N	●	●	●	●	●	●
Tachometer	N	N	N	●	●	●	●	●	●
Other colours than RAL 7030	●	●	●	●	●	●	●	●	●
Special painting N08, N14, Z21, Z05, J08, S10, G04	●	●	●	●	●	●	●	●	●

<sup>1</sup> Only up to frame size 090-112 acc. to DIN 42677

A on request  
N cannot be supplied

○ no extra charge  
● extra charge

#### Following special versions are available on request:

##### Brake motors with additional flywheel mass:

The additional flywheel mass is for jerk-free starting and braking and is mounted under the fan cover.

##### Brake motors with forced ventilation:

In order to obtain a higher switching frequency, the brake motors can be equipped with forced ventilation. In these cases the outside fan is driven by a motor fitted in the fan cover.

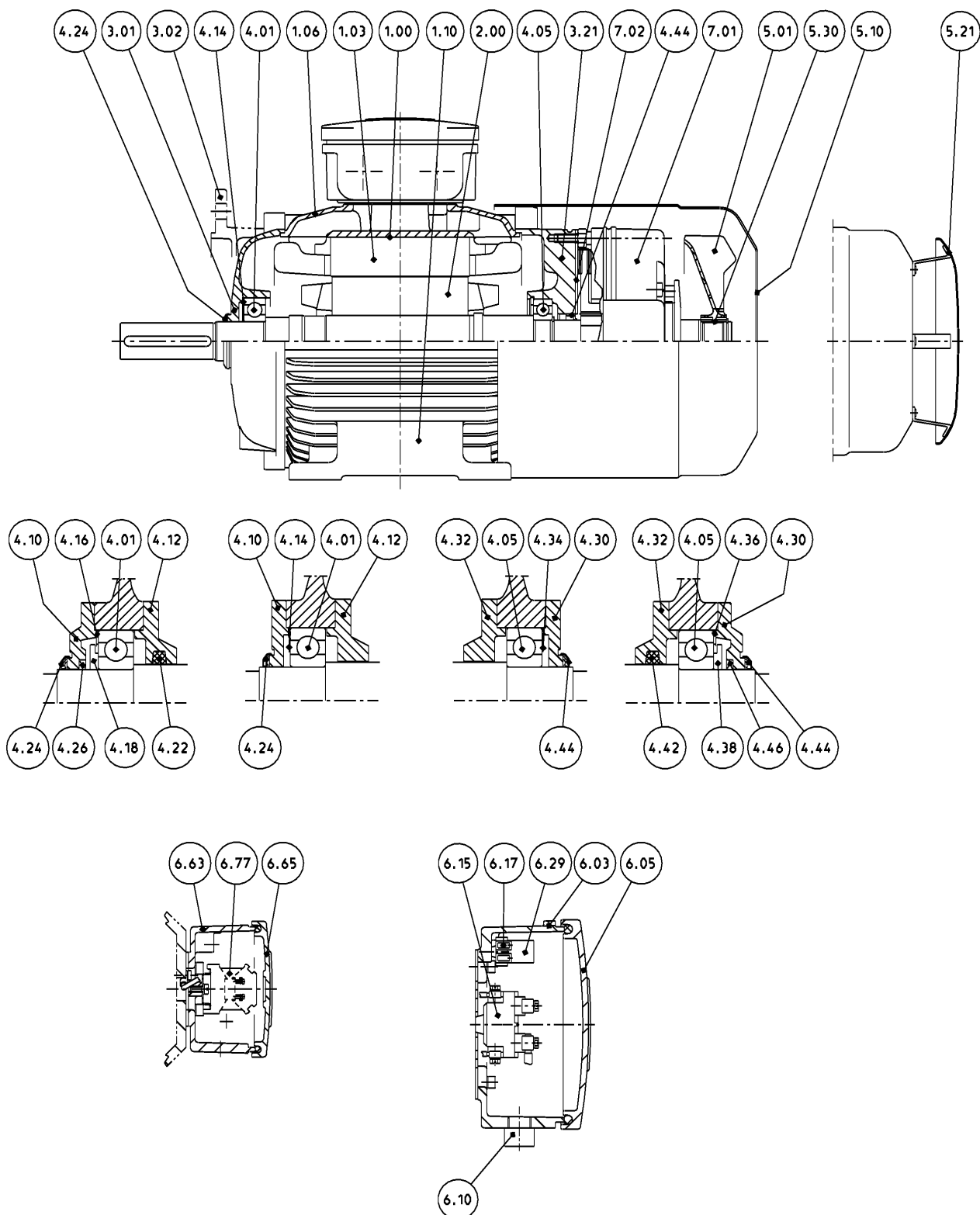
##### Brake motors with holding brake:

In this case the brake is dimensioned according to the braking torque instead of the switching power or frequency. Please contact us in such cases.

##### Pole-changing brake motors:

The brake motors are also available as two-step pole-changing motors for constant torque with outputs and speeds according to this technical list for TEFC three-phase motors.

**Spare parts**  
**Three-phase brake motors with squirrel cage**



## Spare parts

### Three-phase brake motors with squirrel cage

- 1.00 Stator, complete
- 1.03 Stator core with winding
- 1.06 Stator housing
- 1.10 Mounting feet, unmachined  
(1 pair)

- 2.00 Rotor, complete (balanced)

- 3.01 End shield, DE
- 3.02 Flange shield, DE
- 3.21 End shield, NDE

- 4.01 Bearing, DE
- 4.05 Bearing, NDE
- 4.10 Outside bearing cap, DE
- 4.12 Inner bearing cap, DE
- 4.14 Resilient preloading ring, DE
- 4.16 Grease guide disk, DE
- 4.18 Centrifugal disk, DE
- 4.22 Felt packing ring, DE
- 4.24 Outside gasket, DE
- 4.26 Inner gasket, DE
- 4.30 Outside bearing cap, NDE
- 4.32 Inner bearing cap, NDE
- 4.34 Resilient preloading ring, NDE
- 4.36 Grease guide disk, NDE
- 4.38 Centrifugal disk, NDE
- 4.42 Felt packing ring, NDE
- 4.44 Outside gasket, NDE
- 4.46 Inner gasket, NDE

- 5.01 External fan, complete
- 5.10 Fan cover, complete
- 5.21 Protective cover, complete
- 5.30 Spring fastener

- 6.03 Base of terminal box
- 6.05 Terminal box cover
- 6.10 Cable entry
- 6.15 Terminal board, complete
- 6.16 Bushing terminal
- 6.17 Accessory terminal
- 6.20 Clamping
- 6.29 Rectifier

- 6.63 Base of terminal box
- 6.65 Terminal box cover
- 6.77 Accessory terminal

- 7.01 Brake
- 7.02 Intermediate flange

The parts shown are available in different sets depending on type, size, mounting and enclosure. They are available from our works. All other parts such as bolts, spring washers etc. are available anywhere.

**When ordering spare parts, please state:**

**Spare part designation**  
**Motor type**  
**Serial number**

**Example:**

**3.01 End shield, DE**  
**ABGA-200LG-08**  
**3 386 388**



## Brake motors, Series ABGA, Output tables

### Three-phase brake motors with squirrel cage

Totally enclosed fan-cooled, enclosure IP 55

Types: ABGA

Number of poles: 2, 4

400V, 500V, 690V – 50 Hz  
Insulation class F, Utilization to B  
Outputs according to DIN EN 50437

Brake control voltage 230V ~

Type	Rated output	Rated torque $M_N$	Characteristic torque	Rated speed	Rated current at 400V	Efficiency $\eta$	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque $T_I$ $M_A/M_N$	Breakd. torque of the rated torque $T_B$ $M_k/M_N$	Starting current as a multiple of the rated current $I_A/I_N$	Moment of inertia Motor + Brake $J_M$	Frequency of no-load starts $h_{sm}$	Weight for foot-mounted design approx. kg
	kW	Nm	Nm	min <sup>-1</sup>	A	%	cos $\varphi$					kgm <sup>2</sup>	h <sup>-1</sup>	
<b>Speed 3000 1/min</b>														
ABGA-090LX-02	1.5	5.1	16	2835	3.2	78.4	0.88	HS 5	2.5	2.7	5.9	0.002	3000	26
ABGA-090LB-02	2.2	7.5	32	2850	4.6	81.7	0.88	HS 5	2.9	3.0	6.4	0.00226	2700	27
ABGA-100LB-02	3	9.9	32	2880	6	84.2	0.88	HS 5	2.7	3.0	7.0	0.0040	1200	39
ABGA-112MB-02	4	13.3	32	2880	7.5	85.5	0.92	HS 5	2.9	3.5	7.2	0.0067	1100	44
ABGA-132SB-02	5.5	18.1	80	2900	10.8	86.5	0.88	HS 5	3.0	3.3	6.6	0.0135	900	60
ABGA-132SD-02	7.5	24.6	80	2910	14.5	88	0.88	HS 5	3.4	3.8	7.4	0.0155	900	63
ABGA-160MB-02	11	36	150	2920	21	88.5	0.87	HS 5	2.7	2.9	5.9	0.0371	700	123
<b>Speed 1500 1/min</b>														
ABGA-090LX-04	1.1	7.5	16	1405	2.7	77	0.82	HS 4	2.1	2.3	5.0	0.0031	4500	26
ABGA-090LB-04	1.5	10.1	32	1410	3.4	79	0.83	HS 5	2.5	2.7	5.1	0.00336	4500	27
ABGA-100LB-04	2.2	15.0	32	1400	4.8	81	0.84	HS 5	2.2	2.5	5.3	0.00486	4500	39
ABGA-100LD-04	3	20.4	32	1410	6.5	82.6	0.82	HS 5	2.5	2.7	5.8	0.00586	4000	42
ABGA-112MB-04	4	26.9	60	1415	8.3	84	0.84	HS 5	2.2	2.6	5.9	0.0140	3600	46
ABGA-132SB-04	5.5	36.5	80	1440	11	87	0.85	HS 5	2.3	2.7	6.4	0.0221	2100	69
ABGA-132MB-04	7.5	49.5	150	1445	15	88	0.85	HS 5	2.6	3.0	7.2	0.0309	2000	90
ABGA-160MB-04	11	72	150	1460	21	90	0.84	HS 5	2.5	2.4	6.1	0.068	1500	130
ABGA-160LB-04	15	99	260	1455	29	90.7	0.85	HS 4	2.5	2.3	6.2	0.095	1300	155
ABGA-180MB-04	18.5	120	260	1465	34.5	91.3	0.86	DS 5	2.9	2.6	6.8	0.135	1200	182
ABGA-180LB-04	22	143	260	1465	41	91.9	0.86	DS 5	2.9	2.5	6.7	0.1673	1050	200
ABGA-200LG-04	30	195	400	1465	55	92.5	0.87	HS 4	2.4	2.2	6.4	0.26	950	295
ABGA-225SE-04	37	241	400	1470	68	93	0.87	HS 4	2.2	2.2	6.3	0.37	700	335
ABGA-225ME-04	45	292	400	1475	84	93.2	0.84	HS 5	2.6	2.5	6.7	0.42	550	365

Higher outputs, other voltages, frequencies and number of poles upon request.

**Three-phase brake motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

**Types: ABGA****Number of poles: 6, 8**

400V – 50 Hz

Insulation class F, Utilization to B

Outputs according to DIN EN 50437

Brake control voltage 230V ~

Type	Rated output	Rated torque $M_N$	Charac- teristic torque	Rated speed	Rated current at 400V	Effi- ciency $\eta$	Power factor	Rotor class	Starting torque with direct-on multiple of the rated torque $T_I$ $M_A/M_N$	Breakd. torque of the rated torque $T_B$ $M_k/M_N$	Starting current as a rated current $I_A/I_N$	Moment of inertia Motor + Brake $J_M$	Fre- quency of no- load starts $h_{sm}$	Weight for foot- mounted design
	kW	Nm	Nm	$\text{min}^{-1}$	A	%	$\cos \varphi$					$\text{kgm}^2$	$\text{h}^{-1}$	approx. kg
<b>Speed 1000 1/min</b>														
ABGA-090LX-06	0.75	8.0	16	900	2.2	68.3	0.76	HS 4	1.6	1.9	3.2	0.0034	4000	26
ABGA-090LB-06	1.1	11.5	32	915	3.3	72	0.72	HS 4	2.0	2.3	3.3	0.0036	4000	27
ABGA-100LB-06	1.5	15.0	32	940	4.2	76.4	0.7	HS 4	2.2	2.5	4.4	0.0072	4000	40
ABGA-112MB-06	2.2	22.2	60	940	5.3	80	0.77	HS 3	1.7	2.0	4.2	0.015	4000	46
ABGA-132SB-06	3	29.8	80	955	6.3	85.6	0.81	HS 4	2.2	2.7	6.0	0.030	4000	66
ABGA-132MB-06	4	40	80	955	8.8	84.7	0.81	HS 4	2.3	2.6	5.5	0.033	3000	83
ABGA-132MD-06	5.5	55	150	955	11.8	86	0.82	HS 5	2.6	2.6	6.0	0.04	3000	92
ABGA-160MB-06	7.5	74	150	970	16	87.9	0.81	HS 5	2.4	2.8	7.0	0.11	1800	126
ABGA-160LB-06	11	109	260	965	22.5	88.8	0.82	HS 5	2.4	2.8	6.4	0.135	1700	155
ABGA-180LB-06	15	148	260	965	30.5	90	0.80	HS 4	1.6	2.6	5.5	0.14	1500	186
ABGA-200LG-06	18.5	182	400	970	36	90.8	0.83	DS 4	2.2	2.0	5.0	0.31	1350	290
ABGA-200LJ-06	22	218	400	965	44	90.9	0.81	DS 4	2.3	2.0	5.0	0.31	1200	295
ABGA-225ME-06	30	294	400	975	58	91.8	0.83	DS 5	2.6	2.3	5.8	0.57	1000	345
<b>Speed 750 1/min</b>														
ABGA-090LB-08	0.55	7.6	16	690	1.83	68	0.65	HS 3	1.7	1.9	2.7	0.0037	5500	27
ABGA-100LB-08	0.75	10.3	32	695	2.4	69	0.70	HS 4	2.0	2.0	3.8	0.0090	5000	42
ABGA-100LD-08	1.1	15.0	32	700	3.3	69	0.70	HS 4	2.0	2.0	3.7	0.0012	4800	43
ABGA-112MB-08	1.5	20.4	60	700	4.2	75	0.72	HS 4	1.8	2.1	3.7	0.015	4500	48
ABGA-132SB-08	2.2	29.4	80	715	5.6	81.5	0.70	HS 4	2.0	2.3	4.4	0.033	4000	66
ABGA-132MB-08	3	40	80	715	7.5	84	0.70	HS 4	2.1	2.3	4.5	0.046	3700	88
ABGA-160MB-08	4	53.4	150	715	9.25	85	0.75	HS 3	1.6	2.5	4.3	0.1	2600	122
ABGA-160MD-08	5.5	72.4	150	725	13	85	0.74	HS 3	1.9	2.5	4.8	0.13	2300	124
ABGA-160LB-08	7.5	99.5	260	720	17.2	86	0.74	HS 4	2.1	2.6	5.4	0.17	2100	158
ABGA-180LB-08	11	146	260	720	23	87.5	0.79	HS 4	2.0	2.6	5.2	0.20	1850	185
ABGA-200LG-08	15	198	400	720	32.5	88.5	0.77	HS 4	1.8	2.1	4.5	0.35	1600	290
ABGA-225SE-08	18.5	244	400	725	39	89.5	0.77	HS 4	2.4	2.35	4.7	0.48	1300	335
ABGA-225ME-08	22	288	400	730	47.5	90.5	0.74	HS 5	2.8	2.8	5.1	0.57	1100	355

Higher outputs, other voltages, frequencies and number of poles upon request.

## Brake motors, Series ABGA, Dimension drawings

Frame size	IM B3 IM V5 IM V6	IM B5 IM V1 IM V3	IM B14 <sup>1</sup> IM V18 IM V19
090	<b>MLA00-0028</b>	<b>MLA00-0029</b>	<b>MLA00-0002</b>
100			
112			
132			
160			
180			
200			—
225			

<sup>1</sup> Frame sizes 132–180 not included in DIN 42677.

The indicated dimension drawings are included in the Appendix of this technical list from Page 247 in ascending order.

# Aluminium motors, Series BNCA

General data  
Design  
Special designs  
Spare parts

Three-phase motors with squirrel cage  
Frame sizes 71–200  
Aluminium frame

The product range of the aluminium motors serves to supplement the Loher manufacturing program.

## Design

### Number of poles:

2- and 4-pole  
8/4- and 6/4-pole on request

### Frequency:

50 Hz  
60 Hz as option

### Mounting:

IM B3  
IM B5, IM B35, IM B14  
IM V1, IM V3, IM V15, IM V36

### Insulation class:

F/Utilization to B

### Enclosure:

IP 55

### CE-Marking:

CE-Marking acc. to  
Low Voltage Directive

### Motor protection:

PTC thermistor KL 155 as additional  
protection (option)

### Lubrication:

Permanent lubrication

### Rated voltage range:

380–420V

### Drain holes for condensed water:

Available for frames sizes 071–200.

## Inverter operation

At a square load torque under full utilization of the class F insulation the aluminium motors are suitable for inverter operation (acc. to the output assignment at 400V).

## Special designs

- Shaft and flange design with increased precision to DIN 42955
- Protective cover for the fan cowl with design IM V1, IM V5
- Built-in PTC-thermistors
- Cable entry
- Other colour
- Second standard shaft end
- Winding for other output, frequency
- Non-standard cylindrical shaft end

## Spare parts

- Terminal box complete
- End shield DE
- End shield NDE
- Motor feet
- Fan cowl
- Fan

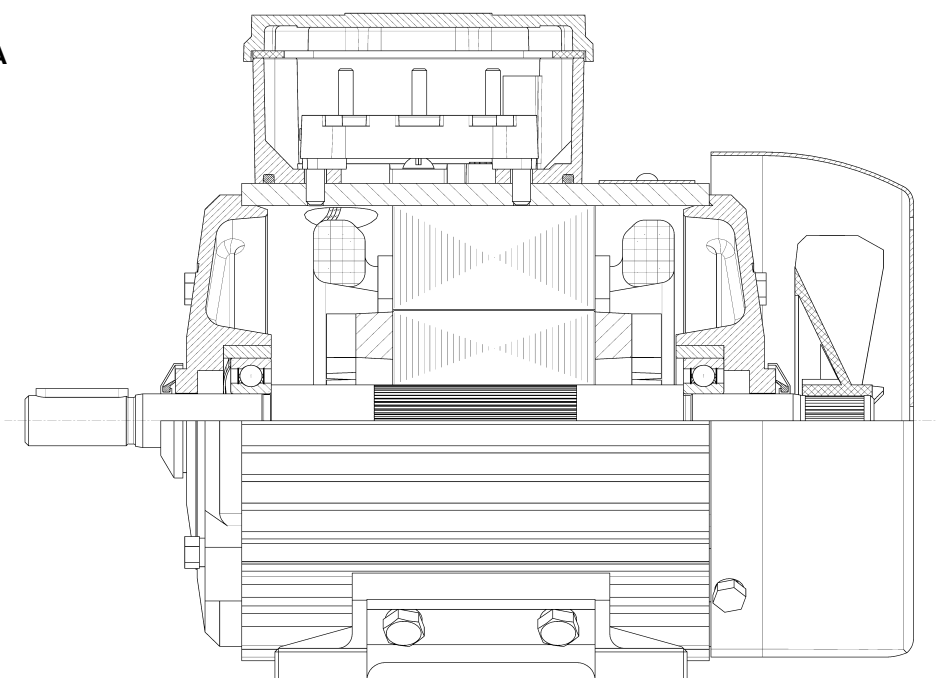
## Sectional view

### Frame, cooling system

## Sectional view

### Surface cooling, cooling system IC 411,

#### Type BNCA



### Stator frame, ventilation

Frame size	Material	Frame Feet <sup>1</sup>	Surface	IMB3	End shield material <sup>3</sup>		Fan cowl Material	Fan <sup>2</sup> Material
071	Aluminium	Aluminium	with cooling fins	Aluminium	IMB5	IMB14	Steel	Plastic
080					Cast iron	Aluminium		
090					Aluminium			
100					Cast iron	Cast iron		
112								
132								
160								
180				Cast iron	—			
200								

<sup>1</sup> For foot-mounting types only.

<sup>2</sup> Suitable for both directions of rotation.

<sup>3</sup> Aluminium end shield with cast-in cast iron bush for bearing seat

## Bearings Greasing Grease life

### Bearings

The motors have deep-groove ball bearings at the DE-side and NDE-side. For the assignment and the designation of the bearings see the table below.

Frame size	Number of poles	Bearings DE	Bearings NDE Mounting IM B 3, IM B 5
071	2-4	6202-2Z	6202-2Z
080	2-4	6204-2Z	6204-2Z
090	2-4	6205-2Z	6205-2Z
100LB	2-4	6206-2Z	6205-2Z
100LC	4	6206-2Z	6206-2Z
112	4	6206-2Z	6206-2Z
112	2	6208-2Z	6208-2Z
132	2-4	6208-2Z	6208-2Z
160	2-4	6309-2Z	6309-2Z
180	2-4	6310-2Z	6309-2Z
200	2-4	6312-2Z	6312-2Z

### Greasing

Bearings from frame sizes 090 to 200 have permanent lubrication. According to experience the grease filled-in at the factory will be sufficient for several years.

Grease:

Lithium-saponified antifriction  
bearing grease  
K3K to DIN 51502

### Grease life

Frame size	Grease life with permanent lubrication in service hours at rated speed					
	Horizontal mounting (B)			Vertical mounting (V)		
	3000 min <sup>-1</sup>	1500 min <sup>-1</sup>	≤ 1000 min <sup>-1</sup>	3000 min <sup>-1</sup>	1500 min <sup>-1</sup>	≤ 1000 min <sup>-1</sup>
071	33000	33000	33000	24000	33000	33000
080				17000	24000	
090	24000					
100				12000	33000	
112		24000	33000			
132	24000					33000
160						
180	24000	33000				
200			24000	33000		

The indicated grease life or relubrication intervals are applicable for an ambient temperature of max. 40°C. For every 10°C temperature rise, the lubrication interval is to be reduced by factor 0.7 of the value shown in the table (max. 20°C = factor 0.5).

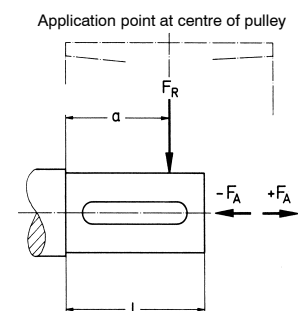
Twice the grease life can be expected at an ambient temperature of ≤ 25°C.  
Intervals for operation of a 60 Hz power supply on request.

## Permissible forces at shaft end

### Permissible forces at shaft end

Figures are valid for bearings and driving shaft ends in this technical list. They have been based on a

calculated useful life of  $L_n = 20\,000$  hours and are permissible for horizontal and vertical shafts.



### Permissible radial force:

Speed [ $\text{min}^{-1}$ ] $a/l$	3000			1500		
	$a = 0$	$a = 0.5 l$	$a = l$	$a = 0$	$a = 0.5 l$	$a = l$
$F_R$ Frame size	N	N	N	N	N	N
071	320	290	270	400	360	330
080	580	520	480	700	630	570
090	500	450	400	750	660	610
100LB	870	770	710	1050	930	830
100LC	—	—	—	1050	930	830
112	1320	1200	1100	1050	930	830
132	1300	1160	1050	1590	1400	1260
160	2400	2090	1860	3000	2610	2300
180	2800	2480	2230	3450	3010	2690
200	3820	3480	3190	4530	4040	3650

The figures have been based on a calculated useful life of 20 000 hours.

### Permissible axial force:

Design Speed [ $\text{min}^{-1}$ ] $+F_A$ or $-F_A$ Frame size	Horizontal shaft		Vertical shaft – upthrust		Vertical shaft – downthrust	
	3000	1500	3000	1500	3000	1500
	N	N	N	N	N	N
071	260	350	250	330	280	370
080	410	550	390	530	440	590
090	440	580	410	540	490	640
100LB	430	570	390	510	650	690
100LC	—	790	—	740	—	900
112	880	780	780	720	990	890
132	850	1130	730	1000	1020	1340
160	1600	2100	1900	2500	1400	1900
180	1600	2100	1900	2500	1300	1800
200	2440	3220	2970	3900	2080	2820

The figures have been based on a calculated useful life of 20 000 hours.

Please contact us in case of combined axial and radial load.

**Weight of rotor**  
**Noise data**  
**Terminal box**

**Weight of rotor**

(incl. shaft and fan) approx. kg

Frame size	3000 min <sup>-1</sup>	1500 min <sup>-1</sup>	Frame size	3000 min <sup>-1</sup>	1500 min <sup>-1</sup>
071BB	1.2	1.8	132SB	11.6	14.2
071BC	1.4	2.0	132SC	13.5	—
080BB	2.0	2.7	132M	—	16.7
080BC	2.3	3.4	160MB	20.8	23.4
090LB	3.1	4.3	160MD	22.6	—
090LD	4.1	5.0	160LB	27.1	28.8
100LB	5.1	7.4	180MB	32.9	34.0
100LC	—	7.8	180LB	—	39.6
112MB	10.1	9.2	200LG	45.6	55.6
			200LJ	55.9	

**Noise data**

The noise data are valid for the rated output at 50 Hz.

The noise measurements are made according to DIN EN ISO 1680.

**Measuring surface sound pressure  $L_{PA}$**

**Sound power level  $L_{WA}$**

Frame size	2-pole 3000 min <sup>-1</sup>		4-pole 1500 min <sup>-1</sup>	
	$L_{PA}$ dB(A)	$L_{WA}$ dB(A)	$L_{PA}$ dB(A)	$L_{WA}$ dB(A)
071	63	72	52	61
080	63	72	52	61
090	63	72	52	61
100	65	74	56	65
112	66	75.5	56	65.5
132	69	78.5	62	70.5
160	71	81	65	75
180	72	82	67	77
200	74	84	69	79

The tolerance is +3 dB

**Terminal box, technical data**

Version: 6 terminals

Terminal box location: on top

Enclosure: IP55

Housing: Aluminium

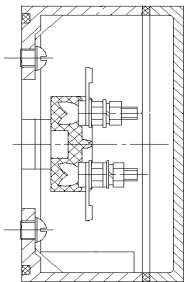
Frame size	Number of cable entries	Terminal stud thread	Max. conductor diameter [mm <sup>2</sup> ]	Max. current per terminal [A]	Rotatability
071	2 x M25x1.5	M4	2.5	16	4 x 90°
080					
090					
100LB					
100LC	1 x M32x1.5	M5	4	25	
112	2 x M32x1.5				
132					
160	2 x M40x1.5	M6	16	63	
180					
200	2 x M50x1.5				2 x 180°

Enclosure is only considered as observed, when the mains connections have also been sealed in the cable entries in accordance with regulations.

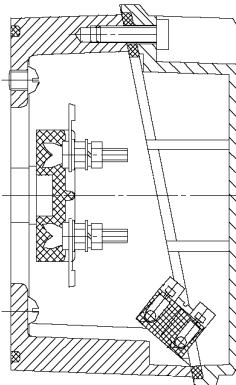


## Terminal box, basic layouts

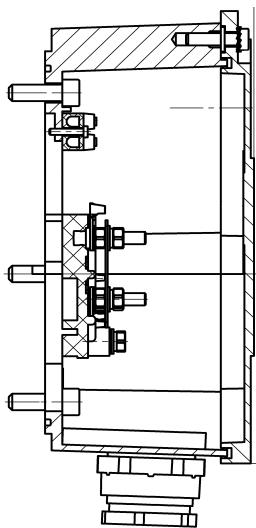
### Terminal box, basic layouts



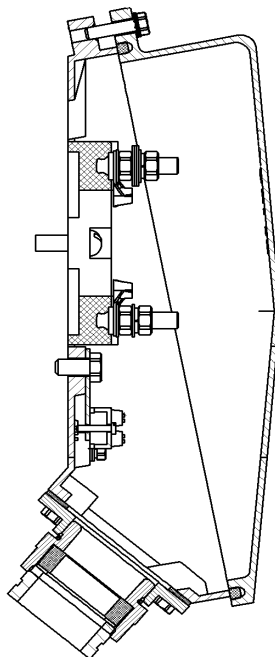
**Frame sizes 071–100LB**



**Frame sizes 100LC–132**



**Frame sizes 160–180**



**Frame size 200**

For connection of monitoring devices (e.g. PTC thermistors) the terminal box is equipped with additional terminals and cable entries.

# Aluminium motors, Series BNCA, Output tables

Types: BNCA

Number of poles: 2, 4, – 50 Hz

380–400–420V – 50 Hz  
Class F insulation  
Utilization to B

Type	Rated output	Rated speed	Rated current at			Efficiency		Efficiency class	Power factor	Rotor class	Starting torque	Break-down torque	Pull-up torque	Starting current	Moment of inertia	Net weight foot-mounted design IM B3 approx.
	kW	min <sup>-1</sup>	380V A	400V A	420V A	4/4 η %	3/4 η %	EFF	(400V) cosφ		M <sub>A</sub> /M <sub>N</sub>	M <sub>K</sub> /M <sub>N</sub>	M <sub>S</sub> /M <sub>N</sub>	I <sub>A</sub> /I <sub>N</sub>	J kgm <sup>2</sup>	kg

## Speed 3000 min<sup>-1</sup>

BNCA-071BB-02	0.37	2820	0.95	0.92	0.90	72	71.5		0.81	HS4	2.7	2.7	2.0	5.0	0.00036	6.8
BNCA-071BC-02	0.55	2820	1.33	1.31	1.30	74	74		0.82	HS4	2.8	2.8	2.0	5.0	0.00044	7.8
BNCA-080BB-02	0.75	2810	1.75	1.72	1.72	76	77		0.83	HS4	2.7	2.8	2.1	5.2	0.00056	8.7
BNCA-080BC-02	1.1	2800	2.50	2.40	2.40	77	77	2	0.86	HS4	2.8	2.8	2.6	5.2	0.00071	10.7
BNCA-090SB-02	1.5	2820	3.30	3.15	3.10	79	79	2	0.87	HS5	2.7	3.0	2.4	6.5	0.00129	13
BNCA-090LB-02	2.2	2820	4.70	4.50	4.40	82	82	2	0.87	HS5	3.0	3.0	2.6	6.5	0.0018	17
BNCA-100LB-02	3	2840	6.1	6.0	5.9	83	83	2	0.87	HS5	4.0	4.2	3.5	7.0	0.0022	21
BNCA-112MB-02	4	2865	7.8	7.6	7.5	86	86	2	0.88	HS4	2.2	3.0	2.0	6.5	0.0080	27
BNCA-132SB-02	5.5	2895	10.4	10	9.7	89	89	1	0.89	HS4	2.4	3.0	2.0	6.5	0.0144	43
BNCA-132SC-02	7.5	2895	14.1	13.6	13.3	89.5	89.5	1	0.89	HS5	2.5	3.5	2.4	7.5	0.0171	49
BNCA-160MB-02	11	2940	21	20	19.5	90.5	90.5	1	0.88	HS3	2.0	3.3	1.6	7.5	0.041	85
BNCA-160MD-02	15	2940	29	28	28	89.5	89.5	2	0.86	HS3	2.0	3.2	1.5	7.5	0.044	92
BNCA-160LB-02	18.5	2940	35	33.5	32	91.8	92	1	0.87	HS3	2.0	3.2	1.5	7.5	0.050	105
BNCA-180MB-02	22	2940	40.5	39	37	91	91	2	0.89	HS4	2.1	3.5	1.7	7.5	0.072	128
BNCA-200LG-02	30	2945	53	51	49	92.9	92.9	1	0.91	HS4	2.3	3.2	1.8	7.5	0.106	180
BNCA-200LJ-02	37	2935	65	63	60	92.5	93	2	0.92	HS4	2.2	3.0	1.7	7.5	0.140	203

## Speed 1500 min<sup>-1</sup>

BNCA-071BB-04	0.25	1440	0.72	0.73	0.75	71	69		0.70	HS4	2.5	3.3	2.1	5.0	0.00086	7.1
BNCA-071BC-04	0.37	1415	0.93	0.92	0.92	73	72.5		0.80	HS3	2.0	2.4	1.7	4.5	0.0011	7.6
BNCA-080BB-04	0.55	1410	1.36	1.34	1.33	74	73.5		0.80	HS3	1.8	2.3	1.4	4.5	0.0015	9.3
BNCA-080BC-04	0.75	1410	1.83	1.83	1.85	76	76		0.78	HS4	2.2	2.6	1.8	5.0	0.0020	11.3
BNCA-090SB-04	1.1	1420	2.7	2.60	2.60	77	77	2	0.80	HS4	2.3	2.6	1.9	5.0	0.0034	14
BNCA-090LB-04	1.5	1420	3.5	3.45	3.45	78.5	78.5	2	0.80	HS4	2.3	2.8	1.9	5.5	0.0042	16
BNCA-100LB-04	2.2	1390	4.9	4.7	4.6	81	82	2	0.83	HS4	2.5	2.8	2.2	5.0	0.0057	21.5
BNCA-100LC-04	3	1430	6.6	6.4	6.4	83	84	2	0.82	HS4	2.2	2.8	2.0	5.7	0.0088	26
BNCA-112MB-04	4	1420	8.5	8.2	8.0	84.2	85	2	0.84	HS4	2.2	2.8	1.8	6.0	0.0160	30
BNCA-132SB-04	5.5	1450	11.2	10.8	10.7	87	87	2	0.85	HS4	2.4	3.0	1.8	7.0	0.0217	45
BNCA-132MB-04	7.5	1455	15.2	14.8	14.7	88	88	2	0.83	HS4	2.8	3.2	2.2	7.0	0.0264	52
BNCA-160MB-04	11	1460	21.5	21	21.4	88.5	88.5	2	0.84	HS3	1.8	2.8	1.4	6.5	0.058	82
BNCA-160LB-04	15	1460	29	28	28	90	90	2	0.86	HS3	1.9	2.9	1.6	7.0	0.075	98
BNCA-180MB-04	18.5	1460	36	34	32	91	91	2	0.86	HS3	1.9	2.9	1.6	7.0	0.093	112
BNCA-180LB-04	22	1460	42	40	38	91	91	2	0.88	HS3	2.1	2.8	1.7	7.0	0.111	128
BNCA-200LG-04	30	1465	54	52	51	92.5	93	2	0.90	HS3	2.0	2.8	1.5	7.2	0.169	180

Tolerances of the electrical data in the output tables acc. to DIN EN 60034-1

## Aluminium motors, Series BNCA, Output tables

Types: BNCA

Number of poles: 2, 4, – 60 Hz

440–460–480V – 60 Hz

Class F insulation

Utilization to B

Type	Rated output	Rated speed	Rated current at			Efficiency		Power factor	Rotor class	Starting torque	Break-down torque	Pull-up torque	Starting current	Moment of inertia	Net weight
	kW	min <sup>-1</sup>	440V A	460V A	480V A	4/4 η %	3/4 η %	(460V) cosφ		M <sub>A</sub> /M <sub>N</sub>	M <sub>K</sub> /M <sub>N</sub>	M <sub>S</sub> /M <sub>N</sub>	I <sub>A</sub> /I <sub>N</sub>	J kgm <sup>2</sup>	foot-mounted design IM B3 approx. kg
<b>Speed 3000 min<sup>-1</sup></b>															
BNCA-071BB-02	0.44	3410	0.95	0.92	0.92	73	71.5	0.82	HS4	2.7	2.7	2.0	5.0	0.00036	6.8
BNCA-071BC-02	0.66	3410	1.35	1.31	1.29	76	74	0.83	HS4	2.8	2.8	2.0	5.0	0.00044	7.8
BNCA-080BB-02	0.9	3400	1.79	1.75	1.73	77	77	0.84	HS4	2.7	2.8	2.1	5.2	0.00056	8.7
BNCA-080BC-02	1.32	3390	2.52	2.45	2.42	78	77	0.87	HS4	2.8	2.8	2.6	5.2	0.00071	10.7
BNCA-090SB-02	1.8	3400	3.30	3.2	3.10	80	79	0.88	HS5	2.7	3.0	2.4	6.5	0.00129	13
BNCA-090LB-02	2.64	3400	4.8	4.6	4.50	82	82	0.88	HS5	3.0	3.0	2.6	6.5	0.0018	17
BNCA-100LB-02	3.6	3420	6.3	6.1	5.9	84	83	0.88	HS5	4.0	4.2	3.5	7.0	0.0022	21
BNCA-112MB-02	4.8	3445	8.3	7.9	7.8	86.5	86	0.88	HS4	2.2	3.0	2.0	6.5	0.0080	27
BNCA-132SB-02	6.6	3480	10.7	10.3	10	89.5	89	0.90	HS4	2.4	3.0	2.0	6.5	0.0144	43
BNCA-132SC-02	9	3470	14.6	14.1	13.8	90	89.5	0.89	HS5	2.5	3.5	2.4	7.5	0.0171	49
BNCA-160MB-02	13.2	3540	22	21	20	90.5	90.5	0.89	HS3	2.0	3.3	1.6	7.5	0.041	85
BNCA-160MD-02	18	3540	29.5	28.5	28	90	89.5	0.88	HS3	2.0	3.2	1.5	7.5	0.044	92
BNCA-160LB-02	22.2	3540	36	34.5	33	92	92	0.88	HS3	2.0	3.2	1.5	7.5	0.050	105
BNCA-180MB-02	26.4	3540	42	40	38	91	91	0.90	HS4	2.1	3.5	1.7	7.5	0.072	128
BNCA-200LG-02	36	3545	55	53	51	93	92.5	0.92	HS4	2.3	3.2	1.8	7.5	0.106	180
BNCA-200LJ-02	44	3530	67	65	62	92.7	93	0.92	HS4	2.2	3.0	1.7	7.5	0.140	203
<b>Speed 1500 min<sup>-1</sup></b>															
BNCA-071BB-04	0.30	1740	0.74	0.75	0.77	72	69	0.71	HS4	2.5	3.3	2.1	5.0	0.00086	7.1
BNCA-071BC-04	0.44	1715	0.95	0.93	0.93	74	72.5	0.80	HS3	2.0	2.4	1.7	4.5	0.0011	7.6
BNCA-080BB-04	0.66	1710	1.38	1.36	1.36	75	73.5	0.81	HS3	1.8	2.3	1.4	4.5	0.0015	9.3
BNCA-080BC-04	0.90	1710	1.87	1.86	1.87	77	76	0.79	HS4	2.2	2.6	1.8	5.0	0.0020	11.3
BNCA-090SB-04	1.32	1715	2.67	2.62	2.60	78	77	0.81	HS4	2.3	2.6	1.9	5.0	0.0034	14
BNCA-090LB-04	1.8	1715	3.6	3.55	3.5	79	78.5	0.80	HS4	2.3	2.8	1.9	5.5	0.0042	16
BNCA-100LB-04	2.64	1685	5.0	4.8	4.7	82	82	0.84	HS4	2.5	2.8	2.2	5.0	0.0057	21.5
BNCA-100LC-04	3.6	1720	6.7	6.5	6.4	84	84	0.83	HS4	2.2	2.8	2.0	5.7	0.0088	26
BNCA-112MB-04	4.8	1710	8.6	8.3	8.1	85	85	0.85	HS4	2.2	2.8	1.8	6.0	0.0160	30
BNCA-132SB-04	6.6	1740	11.4	11	10.7	87.5	87	0.86	HS4	2.4	3.0	1.8	7.0	0.0217	45
BNCA-132MB-04	9	1750	15.4	15	14.8	89.5	88	0.84	HS4	2.8	3.2	2.2	7.0	0.0264	52
BNCA-160MB-04	13.2	1755	22	21.5	21.5	89	88.5	0.86	HS3	1.8	2.8	1.4	6.5	0.058	82
BNCA-160LB-04	18	1755	30	29	28	90.5	90	0.87	HS3	1.9	2.9	1.6	7.0	0.075	98
BNCA-180MB-04	22.2	1755	36	35	33	91.5	91	0.87	HS3	1.9	2.9	1.6	7.0	0.093	112
BNCA-180LB-04	26.4	1755	43	41	39	91.5	91	0.89	HS3	2.1	2.8	1.7	7.0	0.111	128
BNCA-200LG-04	36	1765	57	54	53	93	93	0.90	HS3	2.0	2.8	1.5	7.2	0.169	180

Tolerances of the electrical data in the output tables acc. to DIN EN 60034-1

Types: BVCA

Number of poles: 6/4, 8/4, Fan design

380–400–420V – 50 Hz  
Class F insulation  
Utilization to B

Type	Rated output	Rated speed	Rated current at			Efficiency		Efficiency class	Power factor	Rotor class	Starting torque	Break-down torque	Pull-up torque	Starting current	Moment of inertia	Net weight foot-mounted design IM B3 approx.
						4/4	3/4		(400V)		M <sub>A</sub> /M <sub>N</sub>	M <sub>K</sub> /M <sub>N</sub>	M <sub>S</sub> /M <sub>N</sub>	I <sub>A</sub> /I <sub>N</sub>	J	
	kW	min <sup>-1</sup>	380V A	400V A	420V A	η %	η %	EFF	cosφ						kgm <sup>2</sup>	kg
Speed 1000/1500 min <sup>-1</sup>																
BVCA–080BB–64	0.12	950	0.53	0.55	0.57	43			0.73	HS2	1.3	1.9	0.9	2.6	0.0015	9.3
	0.4	1435	1.25	1.28	1.33	58			0.78		1.2	1.8	0.6	3.3		
BVCA–080BC–64	0.18	950	0.7	0.72	0.73	50			0.72	HS2	1.3	2.1	1.2	2.9	0.0020	11.3
	0.55	1440	1.58	1.61	1.67	64			0.77		1.2	2.1	1.2	3.8		
BVCA–090SB–64	0.28	950	1.08	1.1	1.13	51			0.72	HS2	1.3	1.9	1.0	2.6	0.0034	14.0
	0.9	1415	2.26	2.0	1.19	71			0.83		1.5	2.0	1.0	3.6		
BVCA–090LB–64	0.37	930	1.33	1.34	1.34	53			0.75	HS2	1.1	1.5	0.9	2.5	0.0042	16.0
	1.2	1420	3.02	3.0	2.97	73			0.79		1.7	2.2	1.5	4.2		
BVCA–100LB–64	0.55	930	1.87	1.86	1.87	56			0.76	HS2	1.1	2.2	1.0	2.7	0.0057	21.5
	1.7	1415	4.42	4.14	4.14	74			0.80		1.7	2.7	1.5	4.5		
BVCA–100LC–64	0.75	960	2.43	2.42	2.44	63			0.71	HS2	1.1	2.2	0.9	3.3	0.0088	26.0
	2.2	1450	5.1	4.9	4.9	81			0.80		2.0	2.9	1.7	5.9		
BVCA–112MB–64	0.9	960	2.85	2.85	2.87	68			0.67	HS3	1.5	2.4	1.2	3.7	0.0160	30.0
	3.0	1440	6.7	6.7	6.6	81			0.80		2.0	2.3	1.7	5.9		
BVCA–132SB–64	1.3	975	3.9	3.9	3.93	71			0.68	HS2	1.4	2.4	1.1	4.2	0.0217	45.0
	3.8	1460	8.5	8.3	8.2	84			0.79		2.3	3.1	1.6	7.3		
BVCA–132MB–64	2.0	975	5.8	5.8	5.9	75			0.66	HS2	1.6	2.7	1.2	4.8	0.0264	52.0
	6.0	1460	12.6	12.3	12.2	87			0.81		2.8	3.7	2.1	8.2		
BVCA–160MB–64	2.7	985	6.7	6.6	6.6	74			0.80	HS2	1.0	2.2	0.7	4.5	0.0916	82.0
	7.5	1465	16.8	15.0	15.2	87			0.83		1.9	3.0	1.4	7.0		
BVCA–160MD–64	3.0	980	7.1	6.9	6.8	78			0.80	HS2	1.2	2.3	0.8	5.0	0.1232	99.0
	9.0	1470	17.9	17.4	17.1	87			0.86		1.9	3.1	1.4	8.0		
BVCA–160LB–64	4.0	980	8.9	8.6	8.4	79			0.85	HS2	1.0	2.0	0.6	5.0	0.1232	99.0
	12.0	1470	24.7	24.3	24.6	87			0.82		2.1	3.2	1.4	7.5		
Speed 750/1500 min <sup>-1</sup>																
BVCA–080BB–84	0.12	695	0.62	0.65	0.69	41			0.65	HS2	1.7	2.0	1.5	2.2	0.0015	9.3
	0.55	1415	1.49	1.52	1.59	67			0.78		1.5	2.0	1.3	3.8		
BVCA–080BC–84	0.15	700	0.78	0.82	0.87	42			0.63	HS2	1.6	2.0	1.4	2.4	0.0020	11.3
	0.7	1420	1.89	1.93	1.99	68			0.77		1.4	2.0	1.1	3.7		
BVCA–090SB–84	0.25	690	1.1	1.13	1.17	49			0.65	HS3	1.5	1.8	1.4	2.4	0.0034	14
	1.0	1420	2.55	2.54	2.59	72			0.79		1.7	2.2	1.4	4.2		
BVCA–090LB–84	0.35	690	1.44	1.47	1.51	53			0.65	HS3	1.5	1.8	1.4	2.6	0.0042	16
	1.4	1415	3.55	3.5	3.5	72			0.81		1.5	2.1	1.2	4.3		
BVCA–100LB–84	0.55	705	2.2	2.2	2.3	60			0.60	HS3	1.6	2.4	1.5	3.0	0.0057	21.5
	2.2	1450	5.1	5.0	4.98	81			0.78		1.9	2.8	1.7	5.7		
BVCA–100LC–84	0.65	705	2.44	2.44	2.46	64			0.60	HS3	1.7	2.4	1.6	3.0	0.0088	26
	2.6	1440	5.9	5.8	5.75	81			0.80		2.0	2.7	1.6	5.8		
BVCA–112MB–84	0.9	710	3.1	3.18	3.2	67			0.61	HS3	1.6	2.2	1.4	3.4	0.0160	30
	3.6	1440	7.8	7.7	7.6	82			0.82		1.9	2.6	1.5	5.9		
BVCA–132SB–84	1.3	720	4.1	4.1	4.2	73			0.62	HS3	1.6	2.4	1.4	3.9	0.0217	45
	5.0	1455	10.8	10.6	10.6	84			0.81		1.9	2.9	1.4	6.9		
BVCA–132MB–84	1.7	720	5.6	5.7	5.8	75			0.57	HS3	1.9	3.0	1.9	4.6	0.0264	52
	7.0	1460	14.8	14.5	14.5	86			0.81		2.3	3.3	1.7	7.9		
BVCA–160MB–84	3.0	720	7.7	7.2	7.1	82			0.73	HS2	1.0	1.8	0.9	3.4	0.075	98
	11.0	1465	21.0	20.0	19.5	88			0.90		1.5	2.6	1.2	6.4		

Tolerances of the electrical data in the output tables acc. to DIN EN 60034-1

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**Aluminium motors, Series BNCA, Dimension drawings**


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Frame size	IM B3 IM V5 IM V6	IM B5 IM V1 IM V3
071–200	MEB00-0006	MEB00-0007

The indicated dimension drawings are included in the Appendix of this technical list from Page 247 in ascending order.

# Series ANGK, AMGK, Protection type “n”

Mechanical construction  
Electrical design

## Mechanical construction

See chapter

**Series A..., E..., mechanical construction,**  
**Series A..., E..., spare parts list**  
**Series A..., E..., special designs**

## Electrical design

The motors of the series ANGK or AMGK (totally enclosed fan-cooled, see type code) are available both in standard design (ANGK) and in mechanical VIK design (AMGK), protection type “EEx nA II T3”.

On customer request these motors can be delivered for a fixed voltage (e.g. 400V) or for a voltage range (e.g. 380–420V).

The rated voltages  
400V or 380–420V  
500V or 475–525V  
690V or 655–725V

are standard voltages for 50 Hz systems. Other voltages and frequencies are possible on request. The outputs and electrical data indicated in the tables can be changed by special designs, achieving e.g. an even higher efficiency by means of a rotor with copper cage instead of aluminium die cast.

The insulation system of this motor series is suitable for mains voltages up to 1000V. The connecting (terminal box, terminals) up to including frame size 160 is designed for rated voltages up to 750V, in case of the frame sizes 180–355 for rated voltages up to 1100V.

The general use of overcoat double-enamelled wires and optimized impregnating methods also allows an inverter operation for most motors of this series without modifying the electrical design. However the standards require the motor manufacturer to make an initial type test together with the origi-

nal inverter. The permissible basic data and parameters for inverter operation are summarized in our Technical List UN 03: The output tables of the ANGA motors are applicable.

Inverter motors of the series A.GK are equipped with PTC thermistors. At inverter operation the sole motor protection by means of these temperature detectors together with a certified tripping device (e.g. LOHER Calomat) is possible. No motor protection circuit breakers are necessary. In most cases PTC thermistors with nominal shutdown temperature of 145°C (“KL145”) are used. It is also possible to provide further PTC thermistors in the motor, e.g. early warning detectors. Also see the section “Electrical design, general / Thermal motor protection”.

The motors are fitted with 6 terminals, allowing “star” (Y) or “delta” (Δ) connection. Standard connection of all 400V motors is delta and therefore suitable for 400V Δ/ 690V Y as well as for Y-Δ starting at 400V.

The 500V motors are available both for 500V Y and 500V Δ, if not for winding reasons one of the both versions is to be preferred.

The motors of the series A.GK have the winding executed in class F insulation, thermal utilization only to class “B”. Exceptions are marked in the output tables by an \*. In accordance with the latest standard EN 60034-1 the thermal utilization, if it is inferior to the insulation class, will be stamped on the rating plate additionally to the

insulation class. Therefore the motors of these series will be stamped with “F–B” or those identified by an \* with “F”.

Both for fixed voltage (e.g. 400V, 500V or 690V) and voltage range (e.g. 380–420V, 475–525V or 655–725V) a tolerance of  $\pm 5\%$  for the “Range A” is admissible to EN 60034-1 (“VDE 0530”). This results in the following:

For the fixed voltage motor, e.g. 400V, this “Range A” goes from 380–420V. Within this range the motor must be reliably functioning in continuous duty, the temperature rise of the winding at the tolerance limits is allowed to be 10 K higher than the limit value of the insulation class. The electrical data (“Rated data”) always refer to the mean range, e.g. to 400V. Here the temperature rise of the winding is measured and the thermal utilization is determined.

## Electrical design

The upper and lower limit of "Range A" is joined by "Range B". Its tolerance limits are at  $\pm 10\%$  of the rated voltage. For the 400V motor these are e.g. 360–440V. An operation at these tolerance limits of "B" for a longer time is not recommended however, the motor must still be reliably functioning and is not allowed to differ essentially from the characteristic data. (For EEx e motors it is not admissible at all).

Accordingly, the tolerance limits of "Range A" are between 361V and 441V for the voltage range motor (e.g. 380–420V). "Range B" starts at 342V and ends at 462V. (see chart in section "Electrical design, general / Standard voltages and tolerances" in this technical list). A motor being stamped e.g. with 380–420V is to keep the limit temperature according to its insulation class at every voltage between 380V and 420V, 10 K more are allowed between 361V and 441V.

All motors of the series A.GK being operated in the mean range will be utilized to insulation class "B". At the rated voltage limits of the wide voltage range motors a slightly higher temperature rise than in the mean range can occur. Therefore, these are generally marked on the rating plate as follows:

400V: F–B, 380–420V: F

The few exceptions are motors for which insulation class F is already required at mid-voltage. They are marked with an \* and stamped with "F".

Since there is sometimes uncertainty about the stamp data, utilization and guaranteed data of the wide voltage range motor a detailed description is given below:

For the voltage range motors (e.g. 380–420V) of the series A.GK the electrical data are measured in the mean range (e.g. at 400V) at rated output and rated torque first. Obtained are the power factor, efficiency, speed (torque), starting current ( $I_A$  absolute), noise, torque characteristic, temperature rise of the winding and no-load data.

All guaranteed data indicated in this list or in the data sheet must meet within the tolerances these measured values at mid-voltage.

Maintaining the torque calculated from the rated output and the rated speed ("rated torque"), the currents at the limits of the rated voltage (e.g. at 380V and at 420V) are still to be determined now.

The maximum current from the rated voltage range (e.g. 380–420V) is determined as rated current and stamped onto the rating plate.

(For the fixed voltage motor only the "mid-current", which means e.g. at 400V, is decisive).

For rating and Ex-approval of the voltage range motor this means that the worst value within the voltage range (at maximum current of this range) is decisive for the temperature rise of all motor parts.

The motors of the series A.GK are certified for temperature class "T3". This means that no component (also inside the housing, e.g. cage winding in the rotor!) is allowed to exceed 200°C. The winding temperature is of course limited by the insulation class (e.g. "F": 145°C).

Generally and independently of the fact, whether single voltage or wide voltage range motor, the observance of the temperature limits for the EEx nA II T. motor is also the compelling reason for the above mentioned initial test at the original inverter.

Important still seems to be the information on the special case "locked shaft" and "starting". These two special cases are in principle excluded from protection type EEx nA II T. Limit temperatures are admissible disregarding the temperature class.

Specific data is given in our Technical Information TI No. 05/02. Although locked shaft and starting are excluded, an EEx nA II T. motor is not allowed to be used under heavy starting conditions.

EEx nA II T. motors are allowed to be operated at soft-starters, when

- the soft-starter is functionally tested by the PTB

- a motor protection circuit breaker is fitted as minimum protection
- regarding the duty type no worth-mentioning influence of the starting procedure on the temperature rise is to be expected (e.g. pump drives with a low moment of inertia).

## Series AMGK, Output tables

### Three-phase motors with squirrel cage

Totally enclosed fan-cooled, enclosure IP 55

Protection type "n"

Types: AMGK

Number of poles: 2 – 50 Hz

400V, 500V, 690V – 50 Hz

Class F insulation, Utilization to B

Outputs up to AMGK-315 MB

in accordance with DIN EN 50347

Type	Rated output	Rated speed	Rated current at			Efficiency 4/4 $\eta$	Efficiency 3/4 $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque with direct-on starting as a multiple of the rated torque	Starting current with direct-on starting as a multiple of the rated current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	400V A	500V A	690V A	%	%	cos $\varphi$		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 3000 min<sup>-1</sup></b>														
AMGK-090LX-02	1.5	2835	3.2	2.6	1.9	78.4	77	0.88	HS 5	2.5	2.7	5.9	0.002	22
AMGK-090LB-02	2.2	2850	4.6	3.7	2.7	81.7	80	0.88	HS 5	2.9	3.0	6.4	0.002	22
AMGK-100LB-02	3	2880	6	4.8	3.5	84.2	83	0.88	HS 5	2.7	3.0	7.0	0.0039	35
AMGK-112MB-02	4	2880	7.5	6.0	4.35	85.5	84	0.92	HS 5	2.9	3.5	7.2	0.006	38
AMGK-132SB-02	5.5	2900	10.8	8.7	6.3	86.5	85.5	0.88	HS 5	3.0	3.3	6.6	0.011	53
AMGK-132SD-02	7.5	2910	14.5	11.6	8.4	88	87	0.88	HS 5	3.4	3.8	7.4	0.014	56
AMGK-160MB-02	11	2920	21	16.8	12.2	88.5	88.2	0.87	HS 5	2.7	2.9	5.9	0.0364	104
AMGK-160MD-02	15	2920	28	22.4	16.2	90	89.5	0.89	HS 5	2.7	3.0	6.0	0.045	106
AMGK-160LB-02	18.5	2920	33	26.5	19.2	91	90	0.90	HS 5	2.9	3.0	6.4	0.057	130
AMGK-180MB-02	22	2950	41.5	33.5	24	91	90	0.87	HS 5	2.2	3.0	7.0	0.094	162
AMGK-200LG-02	30	2960	52	42	30.5	92.5	91	0.91	HS 4	2.4	2.6	7.4	0.182	252
AMGK-200LJ-02	37	2955	65	52	38	93	92	0.90	HS 4	2.6	2.8	7.5	0.200	262
AMGK-225ME-02	45	2965	79	63	45.5	93.5	92.5	0.89	HS 5	2.2	2.7	7.1	0.247	305
AMGK-250ME-02	55	2975	99	79	58	94.1	93.2	0.86	HS 5	2.3	3.2	7.4	0.45	410
AMGK-280SG-02	75	2980	128	103	75	94.7	94	0.90	HS 4	2.2	2.2	6.8	0.88	555
AMGK-280MG-02	90	2975	155	124	90	95	94.5	0.90	HS 4	2.0	2.2	6.5	1.03	590
AMGK-315SB-02 <sup>1</sup>	110	2975	190	152	110	95	94.5	0.89	DS 4	2.0	2.4	6.5	1.61	735
AMGK-315MB-02 <sup>1</sup>	132	2980	225	180	130	95.5	95	0.89	DS 4	2.0	2.5	6.5	1.91	835
AMGK-315MD-02 <sup>1</sup>	160	2980	275	220	160	95.8	95.2	0.89	DS 4	2.3	2.6	6.7	2.3	905
AMGK-315LB-02* <sup>1</sup>	200	2980	335	270	195	96	95.6	0.90	DS 4	2.5	2.7	6.8	2.8	1085
AMGK-355MB-02	250	2980	425	340	246	96	95.6	0.89	DS 4	2.0	2.5	6.9	3.8	1360
AMGK-355LB-02*	315	2985	535	428	310	96.4	96	0.89	DS 4	2.2	2.7	7.2	4.7	1580

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

<sup>1</sup> Type AMGK-315

We reserve us the right to deliver foot-mounted types (AMSK) in welded design.  
(Additional weight approx. 80 kg acc. to quotation and confirmation respectively).



**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection type “n”

**Types: AMGK**

**Number of poles: 4 – 50 Hz**

400V, 500V, 690V – 50 Hz  
Class F insulation, Utilization to B  
Outputs up to AMGK-315 MB  
in accordance with DIN EN 50347

Type	Rated output	Rated speed	Rated current at			Effi- ciency 4/4 η	Effi- ciency 3/4 η	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	400V A	500V A	690V A	%	%	cosφ		with rated torque	direct-on starting as a multiple of the rated torque	rated current	kg m <sup>2</sup>	approx. kg
Speed 1500 min <sup>-1</sup>														
AMGK-090LX-04	1.1	1400	2.6	2.2	1.55	77	77	0.83	HS 4	2.1	2.3	5.0	0.0036	22
AMGK-090LB-04	1.5	1410	3.4	2.72	2.0	79	79	0.83	HS 5	2.5	2.7	5.1	0.0036	22
AMGK-100LB-04	2.2	1400	4.8	3.85	2.8	81	81	0.84	HS 5	2.2	2.5	5.3	0.0051	35
AMGK-100LD-04	3	1410	6.6	5.3	3.8	82.6	82.5	0.82	HS 5	2.5	2.7	5.8	0.0066	38
AMGK-112MB-04	4	1415	8.3	6.6	4.8	84	84	0.84	HS 5	2.2	2.6	5.9	0.012	41
AMGK-132SB-04	5.5	1440	11	8.8	6.4	87	87	0.85	HS 5	2.3	2.7	6.4	0.022	59
AMGK-132MB-04	7.5	1445	15	12	8.7	88	88	0.85	HS 5	2.6	3.0	7.2	0.030	69
AMGK-160MB-04	11	1460	21	16.8	12.2	90	90	0.84	HS 5	2.5	2.4	6.1	0.068	108
AMGK-160LB-04	15	1455	29	23.2	16.8	90.7	90.8	0.85	HS 4	2.9	2.3	6.2	0.092	130
AMGK-180MB-04	18.5	1465	34.5	28.0	20	91.3	91.3	0.86	DS 5	2.9	2.6	6.8	0.13	162
AMGK-180LB-04	22	1465	41	32.5	24	91.9	91.9	0.86	DS 5	2.9	2.5	6.7	0.16	176
AMGK-200LG-04	30	1465	55	44	31.5	92.5	92.6	0.87	HS 4	2.4	2.2	6.4	0.25	254
AMGK-225SE-04	37	1470	68	54.5	39.5	93	93	0.87	HS 4	2.2	2.2	6.3	0.35	305
AMGK-225ME-04	45	1475	84	67	49	93.2	93.1	0.84	HS 5	2.6	2.5	6.7	0.41	335
AMGK-250ME-04	55	1480	97	77	56	94.5	94.5	0.88	HS 5	2.4	2.9	7.6	0.80	425
AMGK-280SG-04	75	1480	132	106	77	94.7	94.7	0.88	HS 4	2.2	2.5	6.5	1.44	585
AMGK-280MG-04	90	1480	157	126	91	95	95	0.88	HS 4	2.3	2.5	6.5	1.65	660
AMGK-315SB-04	110	1485	200	160	116	95.2	95	0.85	DS 4	2.1	2.3	6.5	2.4	795
AMGK-315MB-04	132	1485	240	192	139	95.5	95.3	0.85	DS 4	2.1	2.3	6.5	2.9	890
AMGK-315MD-04	160	1485	285	228	165	95.6	95.5	0.86	DS 4	2.1	2.2	6.5	3.4	960
AMGK-315LB-04*	200	1485	355	285	205	95.7	95.6	0.85	DS 4	2.5	2.5	6.6	4.0	1165
AMGK-355MB-04	225	1488	400	320	232	96	95.8	0.85	DS 4	2.0	2.5	6.8	5.5	1520
AMGK-355MB-04*	250	1490	446	357	259	96	95.9	0.85	DS 4	2.0	2.5	6.9	5.5	1520
AMGK-355MB-04	250	1490	435	348	252	96.4	96.3	0.86	HS 2	1.2	2.3	6.9	5.5	1520
AMGK-355LB-04	270	1489	480	384	278	96.2	95.9	0.85	DS 4	2.1	2.5	7.0	6.8	1730
AMGK-355LB-04*	315	1489	555	444	322	96.4	96	0.85	DS 4	2.1	2.5	7.1	6.8	1730
AMGK-355LB-04	315	1491	545	436	316	96.6	96.4	0.86	HS 2	1.3	2.5	7.0	6.8	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

1 Explanations see “Efficiency marking”

For special design the motors of efficiency class 2 from 5.5 kW can be upgraded to efficiency class 1. [surcharge, inquiry]

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection type “n”

400V, 500V, 690V – 50 Hz  
Class F insulation, Utilization to B  
Outputs up to AMGK-315 MB  
in accordance with DIN EN 50347

**Types: AMGK**

**Number of poles: 6 – 50 Hz**

Type	Rated output	Rated speed	Rated current at			Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	400V A	500V A	690V A	%	cos $\varphi$		rated torque	with direct-on starting as a multiple of the rated torque	rated current	kg m <sup>2</sup>	approx. kg
Speed 1000 min <sup>-1</sup>													
AMGK-090LX-06	0.75	900	2.2	1.76	1.28	68.3	0.76	HS 4	1.6	1.9	3.2	0.0036	22
AMGK-090LB-06	1.1	915	3.3	2.65	1.9	72	0.72	HS 4	2.0	2.3	3.3	0.0036	22
AMGK-100LB-06	1.5	940	4.2	3.4	2.45	76.4	0.7	HS 4	2.2	2.5	4.4	0.0086	35
AMGK-112MB-06	2.2	940	5.3	4.3	3.1	80	0.77	HS 3	1.7	2.0	4.2	0.014	38
AMGK-132SB-06	3	955	6.3	5.1	3.7	85.6	0.81	HS 4	2.2	2.7	6.0	0.030	59
AMGK-132MB-06	4	955	8.8	7.0	5.1	84.7	0.81	HS 4	2.3	2.6	5.5	0.033	67
AMGK-132MD-06	5.5	955	11.8	9.5	6.8	86	0.82	HS 5	2.6	2.6	6.0	0.045	72
AMGK-160MB-06	7.5	970	16	12.8	9.2	87.9	0.81	HS 5	2.4	2.8	7.0	0.100	108
AMGK-160LB-06	11	965	22.5	18	13	88.8	0.82	HS 5	2.4	2.8	6.4	0.134	130
AMGK-180LB-06	15	965	30.5	24.5	18	90	0.8	HS 4	1.6	2.6	5.5	0.13	176
AMGK-200LG-06	18.5	970	36	29	21	90.8	0.83	DS 4	2.2	2.0	5.0	0.33	262
AMGK-200LJ-06	22	965	44	36	26	90.9	0.81	DS 4	2.3	2.0	5.0	0.33	282
AMGK-225ME-06	30	975	58	46	34	91.8	0.83	DS 5	2.6	2.3	5.8	0.55	315
AMGK-250ME-06	37	985	73	58.5	42	92.5	0.8	DS 4	2.3	2.2	6.6	1.00	420
AMGK-280SG-06	45	985	81	65	47	93.3	0.87	DS 4	2.1	2.1	6.2	1.87	605
AMGK-280MG-06	55	985	100	80	58	93.4	0.86	DS 4	2.1	2.4	6.2	2.3	670
AMGK-315SB-06	75	990	136	110	79	94.6	0.85	DS 4	2.2	2.3	6.6	3.3	795
AMGK-315MB-06	90	990	160	130	93	94.8	0.86	DS 4	2.1	2.3	6.7	4.0	890
AMGK-315MC-06	110	990	195	156	113	95.2	0.87	DS 4	2.3	2.3	7.0	4.9	960
AMGK-315MD-06*	132	990	229	183	132	95.3	0.87	DS 4	2.4	2.2	6.9	4.9	960
AMGK-315LB-06	160	990	278	222	161	95.5	0.87	DS 4	2.4	2.3	7.0	6.0	1165
AMGK-355MB-06	200	993	355	284	205	96.1	0.85	HS 2	1.3	2.5	6.4	7.8	1520
AMGK-355LB-06	250	993	445	356	257	96.2	0.85	HS 2	1.1	2.5	6.3	8.9	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection “n”

**Types: AMGK**

**Number of poles: 8**

400V, 500V, 690V – 50 Hz  
Class F insulation, Utilization to B  
Outputs up to AMGK-315 MB  
in accordance with DIN EN 50347

Type	Rated output	Rated speed	Rated current at			Efficiency η	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia	Net weight
	kW	min <sup>-1</sup>	400V A	500V A	690V A				%	cosφ	rated torque	with direct-on starting as a multiple of the rated torque	rated current
Speed 750 min <sup>-1</sup>													
AMGK-090LX-08	0.37	680	1.38	1.1	0.8	64	0.62	HS 4	1.6	1.9	2.7	0.0036	22
AMGK-090LB-08	0.55	670	1.90	1.5	1.1	65	0.65	HS 4	1.6	1.9	2.7	0.0036	22
AMGK-100LB-08	0.75	695	2.2	1.8	1.3	69	0.71	HS 4	2.0	2.1	3.9	0.0086	35
AMGK-100LD-08	1.1	690	3.2	2.5	1.8	70	0.73	HS 4	1.7	2.0	3.5	0.0100	38
AMGK-112MB-08	1.5	700	4.20	3.35	2.4	74	0.72	HS 4	1.9	2.1	3.7	0.0140	40
AMGK-132SB-08	2.2	715	5.6	4.5	3.2	82	0.70	HS 4	2.0	2.3	4.4	0.032	59
AMGK-132MB-08	3	715	7.5	6	4.4	83	0.70	HS 4	2.1	2.3	4.5	0.045	72
AMGK-160MB-08	4	715	9.2	7.4	5.3	83.5	0.76	HS 3	1.7	2.1	4.3	0.092	104
AMGK-160MD-08	5.5	725	12.9	10.3	7.5	84	0.74	HS 3	1.8	2.4	5.3	0.12	108
AMGK-160LB-08	7.5	720	17.3	13.7	10	86	0.74	HS 4	2.1	2.4	5.4	0.16	130
AMGK-180LB-08	11	715	23.3	18.6	13.4	87.5	0.78	HS 4	1.8	2.6	5.0	0.19	176
AMGK-200LG-08	15	720	32.5	26.0	18.7	89	0.76	HS 4	1.8	2.1	4.0	0.33	258
AMGK-225SE-08	18.5	725	39	31.0	22.5	89.5	0.77	HS 4	2.4	2.4	5.0	0.46	305
AMGK-225ME-08	22	730	48	38.5	27.5	90.5	0.73	HS 5	3.8	3.0	5.1	0.55	325
AMGK-250ME-08	30	735	58	46.5	33.5	91.5	0.80	HS 4	1.9	2.2	5.3	1.0	415
AMGK-280SG-08	37	735	72	58	41.5	92	0.80	DS 4	1.8	2.2	5.0	1.9	585
AMGK-280MG-08	45	740	88	71	51	92.5	0.80	DS 4	2.2	2.1	5.0	2.2	640
AMGK-315SB-08	55	740	110	87	63.5	94.5	0.78	DS 4	1.6	2.0	6.0	3.3	780
AMGK-315MB-08	75	740	146	117	85	94.4	0.79	DS 4	1.6	2.5	5.8	4.0	875
AMGK-315MC-08	90	740	175	140	102	94.4	0.79	DS 4	1.7	2.0	5.8	4.8	940
AMGK-315MD-08*	110	740	216	173	125	94.4	0.79	DS 4	1.7	2.0	5.8	4.8	940
AMGK-315LB-08*	132	740	255	205	147	94.5	0.79	DS 4	1.6	2.0	5.8	6.0	1145
AMGK-355MB-08	160	740	295	235	170	95.2	0.82	HS 2	1.3	2.0	5.3	12.4	1560
AMGK-355LB-08	200	740	370	295	214	95.5	0.82	HS 2	1.3	2.2	5.5	14.7	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**Three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

Protection type “n”

400V, 500V, 690V – 50 Hz

Class F insulation, Utilization to B

**Types: AMGK****Number of poles: 10****Types: AMGK****Number of poles: 12**

Type	Rated output	Rated speed	Rated current at			Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	400V A	500V A	690V A	%	cos $\varphi$		rated torque			kg m <sup>2</sup>	approx. kg
<b>Speed 600 min<sup>-1</sup></b>													
AMGK-112MB-10	1.1	560	4.2	3.4	2.4	68	0.58	HS 3	1.7	2.1	3.0	0.0170	40
AMGK-132SB-10	1.5	570	4.3	3.5	2.5	77	0.65	HS 3	1.6	2.0	3.3	0.033	59
AMGK-132MB-10	2.2	570	7.1	5.7	4.1	78	0.62	HS 3	1.8	2.3	3.5	0.04	72
AMGK-160MB-10	3	570	8.0	6.4	4.6	81	0.67	HS 4	1.9	2.5	4.4	0.09	104
AMGK-160MD-10	4	570	10.3	8.2	6.0	81	0.70	HS 4	2.0	2.5	4.7	0.12	108
AMGK-160LB-10	5.5	575	13.6	10.9	7.9	83.5	0.70	HS 3	1.8	2.2	4.9	0.15	130
AMGK-180LB-10	7.5	575	18	14.5	10.4	84	0.74	HS 3	1.8	2.9	4.9	0.19	176
AMGK-200LG-10	11	575	27	22	15.5	85	0.69	HS 3	1.8	2.9	5.0	0.33	262
AMGK-225SE-10	15	580	37	30	21	85	0.70	HS 3	1.4	2.6	4.5	0.47	305
AMGK-225ME-10	18.5	580	42	33	24	86.5	0.74	HS 3	1.5	2.6	4.8	0.55	325
AMGK-250ME-10	22	585	49	39	29	88	0.74	HS 3	1.5	2.5	5.2	1.0	425
AMGK-280SG-10	30	590	60	48	35	91	0.78	DS 4	1.9	2.1	5.0	2.2	585
AMGK-280MG-10	37	590	74	59	43	91.5	0.78	HS 3	1.7	2.0	5.0	2.6	640
AMGK-315SB-10	45	590	84	68	49	92.2	0.83	HS 3	1.5	2.4	5.9	4.2	800
AMGK-315MB-10	55	590	105	83	60	92.5	0.83	HS 3	1.5	2.4	5.9	5.1	895
AMGK-315MD-10	75	590	143	113	83	93.2	0.82	HS 3	1.5	2.6	5.9	5.9	960
AMGK-315LB-10	90	590	169	135	98	93.7	0.82	HS 3	1.3	2.3	5.9	7.5	1105
AMGK-355MB-10	110	590	205	165	120	94.2	0.82	HS 2	1.2	2.3	5.6	9.7	1450
AMGK-355MD-10	132	590	249	200	145	94.5	0.81	HS 2	1.2	2.3	5.6	11.4	1670
AMGK-355LB-10	160	590	300	241	175	94.6	0.81	HS 2	1.2	2.3	5.9	13.8	1900

**Speed 500 min<sup>-1</sup>**

AMGK-112MB-12	0.75	440	3.5	2.7	2.0	60	0.56	HS 4	1.8	2.0	2.6	0.017	40
AMGK-132SB-12	1.1	470	4	3.2	2.3	70	0.56	HS 4	1.8	1.9	3.1	0.033	59
AMGK-132MB-12	1.5	470	5.4	4.3	3.1	74	0.57	HS 4	1.8	2.0	3.2	0.045	72
AMGK-160MB-12	2.2	465	6.8	5.5	3.9	78	0.62	HS 3	1.6	2.4	3.5	0.070	104
AMGK-160MD-12	3	465	8.8	7	5.1	78	0.65	HS 3	1.7	2.4	3.9	0.096	108
AMGK-160LB-12	4	465	10.9	8.7	6.3	79	0.67	HS 3	1.7	2.4	3.9	0.13	130
AMGK-180LB-12	5.5	465	15.2	12.2	8.8	79	0.67	HS 4	1.8	2.4	3.9	0.16	176
AMGK-200LG-12	7.5	470	20.4	16.3	11.8	84	0.64	HS 3	1.6	2.2	4.0	0.33	262
AMGK-225SE-12	11	480	28	22.5	16.2	86	0.66	HS 3	1.6	2.4	4.1	0.5	305
AMGK-225ME-12	15	480	39	31	22.5	85.5	0.66	HS 3	1.7	2.5	4.2	0.56	325
AMGK-250ME-12	18.5	485	41.5	33	24	89	0.73	HS 3	1.5	2.4	5.0	1.0	425
AMGK-280SG-12	22	485	49.5	40	28.5	90	0.71	DS 4	1.9	1.9	5.0	2.2	585
AMGK-280MG-12	30	490	68	54	39.5	91	0.71	DS 4	2.0	2.0	4.7	2.7	640
AMGK-315SB-12	37	490	82	65	47.5	91.5	0.72	HS 3	1.3	2.1	4.8	4.0	800
AMGK-315MB-12	45	485	99	79	57	91.9	0.72	HS 3	1.3	2.1	5.0	5.0	895
AMGK-315MD-12	55	485	118	94	68	92.5	0.73	HS 2	1.2	2.1	5.0	6.0	970
AMGK-315LB-12	75	490	159	127	92	92.5	0.74	HS 2	1.1	1.9	5.0	7.5	1125
AMGK-355MB-12	90	492	188	150	109	93.4	0.74	HS 2	0.9	2.0	4.3	10	1450
AMGK-355MD-12	110	492	230	185	135	93.7	0.74	HS 2	0.9	2.0	4.3	12	1670
AMGK-355LB-12	140	492	290	232	168	94	0.74	HS 2	0.9	2.0	4.3	14.5	1900

Higher outputs, other voltages and frequencies on request.

Motors from frame size 315 with rotor class DS4 (Utilization to F) on request.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection type “n”

**380V–420V – 50 Hz**  
Class F insulation, Utilization to B  
Outputs up to AMGK-315 MB  
in accordance with DIN EN 50347

**Types: AMGK      Number of poles: 2 – Wide voltage range**

Type	Rated output	Rated speed	Rated current at 380V – 420V A	Efficiency 4/4 $\eta$	Efficiency 3/4 $\eta$	Power factor $\cos\varphi$	Rotor class	Starting torque with direct-on starting as a multiple of the	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>		%	%			rated torque $M_A/M_N$	rated torque $M_K/M_N$	rated current $I_A/I_N$	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 3000 min<sup>-1</sup></b>												
AMGK–090LX–02	1.5	2835	3.3	78.4	77	0.88	HS 5	2.5	2.7	5.7	0.002	22
AMGK–090LB–02	2.2	2850	4.7	81.7	80	0.88	HS 5	2.9	3.0	6.3	0.002	22
AMGK–100LB–02	3	2880	6.3	84.2	83	0.88	HS 5	2.7	3.0	6.7	0.0039	35
AMGK–112MB–02	4	2880	7.8	85.5	84	0.92	HS 5	2.9	3.5	6.9	0.006	38
AMGK–132SB–02	5.5	2900	10.9	86.5	85.5	0.88	HS 5	3.0	3.3	6.5	0.011	53
AMGK–132SD–02	7.5	2910	14.6	88	87	0.88	HS 5	3.4	3.8	7.3	0.014	56
AMGK–160MB–02	11	2920	22	88.5	88.2	0.87	HS 5	2.7	2.9	5.7	0.0364	104
AMGK–160MD–02	15	2920	29	90	89.5	0.89	HS 5	2.7	3.0	5.8	0.045	106
AMGK–160LB–02	18.5	2920	34.5	91	90	0.90	HS 5	2.9	3.0	6.1	0.057	130
AMGK–180MB–02	22	2950	42	91	90	0.87	HS 5	2.2	3.0	6.9	0.094	162
AMGK–200LG–02	30	2960	54	92.5	91	0.91	HS 4	2.4	2.6	7.1	0.182	252
AMGK–200LJ–02	37	2955	67	93	92	0.90	HS 4	2.6	2.8	7.3	0.200	262
AMGK–225ME–02	45	2965	82	93.5	92.5	0.89	HS 5	2.2	2.7	6.8	0.247	305
AMGK–250ME–02	55	2975	101	94.1	93.2	0.86	HS 5	2.3	3.2	7.3	0.45	410
AMGK–280SG–02	75	2980	132	94.7	94	0.90	HS 4	2.2	2.2	6.6	0.88	555
AMGK–280MG–02	90	2975	160	95	94.5	0.90	HS 4	2.0	2.2	6.3	1.03	590
AMGK–315SB–02 <sup>1</sup>	110	2975	198	95	94.5	0.89	DS 4	2.0	2.4	6.3	1.61	735
AMGK–315MB–02 <sup>1</sup>	132	2980	240	95.5	95	0.89	DS 4	2.0	2.5	6.1	1.91	835
AMGK–315MD–02 <sup>1</sup>	160	2980	285	95.8	95.2	0.89	DS 4	2.3	2.6	6.5	2.3	905
AMGK–315LB–02* <sup>1</sup>	200	2980	355	96	95.6	0.90	DS 4	2.5	2.7	6.5	2.8	1085
AMGK–355MB–02	250	2980	450	96	95.6	0.89	DS 4	2.0	2.5	6.5	3.8	1360
AMGK–355LB–02*	315	2985	560	96.4	96	0.89	DS 4	2.2	2.7	6.8	4.7	1580

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

<sup>1</sup> Type AMGK-315

We reserve us the right to deliver foot-mounted types (AMSK) in welded design.  
(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection type “n”

**380V–420V – 50 Hz**  
Class F insulation, Utilization to B  
Outputs up to AMGK-315 MB  
in accordance with DIN EN 50347

**Types: AMGK      Number of poles: 4 – Wide voltage range**

Type	Rated output	Rated speed	Rated current at 380V – 420V A	Efficiency 4/4 η	Efficiency 3/4 η	Power factor cos φ	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque M <sub>A</sub> /M <sub>N</sub>	Breakd. torque M <sub>K</sub> /M <sub>N</sub>	Starting current I <sub>A</sub> /I <sub>N</sub>	Moment of inertia J approx. kgm <sup>2</sup>	Net weight approx. kg
	kW	min <sup>-1</sup>		%	%							
<b>Speed 1500 min<sup>-1</sup></b>												
AMGK–090LX–04	1.1	1400	2.75	77	77	0.83	HS 4	2.1	2.3	4.9	0.0036	22
AMGK–090LB–04	1.5	1410	3.45	79	79	0.83	HS 5	2.5	2.7	5.0	0.0036	22
AMGK–100LB–04	2.2	1400	4.95	81	81	0.84	HS 5	2.2	2.5	5.1	0.0051	35
AMGK–100LD–04	3	1410	6.7	82.6	82.5	0.82	HS 5	2.5	2.7	5.7	0.0066	38
AMGK–112MB–04	4	1415	8.6	84	84	0.84	HS 5	2.2	2.6	5.7	0.012	41
AMGK–132SB–04	5.5	1440	11	87	87	0.85	HS 5	2.3	2.7	6.4	0.022	59
AMGK–132MB–04	7.5	1445	15	88	88	0.85	HS 5	2.6	3.0	7.2	0.030	69
AMGK–160MB–04	11	1460	21.5	90	90	0.84	HS 5	2.5	2.4	6.0	0.068	108
AMGK–160LB–04	15	1455	31.5	90.7	90.8	0.85	HS 4	2.9	2.3	5.7	0.092	130
AMGK–180MB–04	18.5	1465	36	91.3	91.3	0.86	DS 5	2.9	2.6	6.5	0.13	162
AMGK–180LB–04	22	1465	42	91.9	91.9	0.86	DS 5	2.9	2.5	6.5	0.16	176
AMGK–200LG–04	30	1465	57	92.5	92.6	0.87	HS 4	2.4	2.2	6.2	0.25	254
AMGK–225SE–04	37	1470	70	93	93	0.87	HS 4	2.2	2.2	6.1	0.35	305
AMGK–225ME–04	45	1475	86	93.2	93.1	0.84	HS 5	2.6	2.5	6.5	0.41	335
AMGK–250ME–04	55	1480	100	94.5	94.5	0.88	HS 5	2.4	2.9	7.4	0.80	425
AMGK–280SG–04	75	1480	137	94.7	94.7	0.88	HS 4	2.2	2.5	6.3	1.44	585
AMGK–280MG–04	90	1480	165	95	95	0.88	HS 4	2.3	2.5	6.2	1.65	660
AMGK–315SB–04	110	1485	205	95.2	95	0.85	DS 4	2.1	2.3	6.3	2.4	795
AMGK–315MB–04	132	1485	250	95.5	95.3	0.85	DS 4	2.1	2.3	6.2	2.9	890
AMGK–315MD–04	160	1485	300	95.6	95.5	0.86	DS 4	2.1	2.2	6.2	3.4	960
AMGK–315LB–04*	200	1485	370	95.7	95.6	0.85	DS 4	2.5	2.5	6.3	4.0	1165
AMGK–355MB–04*	225	1488	420	96	95.8	0.85	DS 4	2.0	2.5	6.5	5.5	1520
AMGK–355MB–04	250	1490	455	96.4	96.3	0.86	HS 2	1.2	2.3	6.6	5.5	1520
AMGK–355LB–04*	270	1489	505	96.2	95.9	0.85	DS 4	2.1	2.5	6.7	6.8	1730
AMGK–355LB–04	315	1491	570	96.6	96.4	0.86	HS 2	1.3	2.5	6.7	6.8	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

1 Explanations see “Efficiency marking”

For special design the motors of efficiency class 2 from 5.5 kW can be upgraded to efficiency class 1. [surcharge, inquiry]

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection “n”

**Types: AMGK**

**Number of poles: 6 – Wide voltage range**

**380V–420V – 50 Hz**  
Class F insulation, Utilization to B  
Outputs up to AMGK-315 MB  
in accordance with DIN EN 50347

Type	Rated output	Rated speed	Rated current at 380V – 420V A	Efficiency $\eta$	Power factor $\cos\varphi$	Rotor class	Starting torque  with direct-on starting as a multiple of the	Breakd. torque  with direct-on starting as a multiple of the	Starting current  with direct-on starting as a multiple of the	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>		%			rated torque M <sub>A</sub> /M <sub>N</sub>	rated torque M <sub>K</sub> /M <sub>N</sub>	rated current I <sub>A</sub> /I <sub>N</sub>	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 1000 min<sup>-1</sup></b>											
AMGK-090LX-06	0.75	900	2.3	68.3	0.76	HS 4	1.6	1.9	3.1	0.0036	22
AMGK-090LB-06	1.1	915	3.5	72	0.72	HS 4	2.0	2.3	3.1	0.0036	22
AMGK-100LB-06	1.5	940	4.4	76.4	0.7	HS 4	2.2	2.5	4.2	0.0086	35
AMGK-112MB-06	2.2	940	5.4	80	0.77	HS 3	1.7	2.0	4.1	0.014	38
AMGK-132SB-06	3	955	6.6	85.6	0.81	HS 4	2.2	2.7	5.7	0.030	59
AMGK-132MB-06	4	955	9.1	84.7	0.81	HS 4	2.3	2.6	5.3	0.033	67
AMGK-132MD-06	5.5	955	12.2	86	0.82	HS 5	2.6	2.6	5.8	0.045	72
AMGK-160MB-06	7.5	970	16.3	87.9	0.81	HS 5	2.4	2.8	6.9	0.100	108
AMGK-160LB-06	11	965	23	88.8	0.82	HS 5	2.4	2.8	6.3	0.134	130
AMGK-180LB-06	15	965	31	90	0.8	HS 4	1.6	2.6	5.4	0.13	176
AMGK-200LG-06	18.5	970	37.5	90.8	0.83	DS 4	2.2	2.0	4.8	0.33	262
AMGK-200LJ-06	22	965	47	90.9	0.81	DS 4	2.3	2.0	4.7	0.33	282
AMGK-225ME-06	30	975	60	91.8	0.83	DS 5	2.6	2.3	5.6	0.55	315
AMGK-250ME-06	37	985	76	92.5	0.8	DS 4	2.3	2.2	6.3	1.00	420
AMGK-280SG-06	45	985	86	93.3	0.87	DS 4	2.1	2.1	5.8	1.87	605
AMGK-280MG-06	55	985	105	93.4	0.86	DS 4	2.1	2.4	5.9	2.3	670
AMGK-315SB-06	75	990	142	94.6	0.85	DS 4	2.2	2.3	6.3	3.3	795
AMGK-315MB-06	90	990	170	94.8	0.86	DS 4	2.1	2.3	6.3	4.0	890
AMGK-315MC-06	110	990	200	95.2	0.87	DS 4	2.3	2.3	6.8	4.9	960
AMGK-315MD-06*	132	990	240	95.3	0.87	DS 4	2.4	2.2	6.6	4.9	960
AMGK-315LB-06	160	990	290	95.5	0.87	DS 4	2.4	2.3	6.7	6.0	1165
AMGK-355MB-06	200	993	370	96.1	0.85	HS 2	1.3	2.5	6.2	7.8	1520
AMGK-355LB-06	250	993	467	96.2	0.85	HS 2	1.1	2.5	6.0	8.9	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection type "n"

440V – 60 Hz  
Class F insulation, Utilization to B  
Temperature class T3

**Types: AMGK      Number of poles: 2 – 60 Hz**

Type	Rated output	Rated speed	Rated current at	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque with direct-on starting as a multiple of the	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	440V A	%	cos $\varphi$		rated torque M <sub>A</sub> /M <sub>N</sub>	rated torque M <sub>K</sub> /M <sub>N</sub>	rated current I <sub>A</sub> /I <sub>N</sub>	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 3600 min<sup>-1</sup></b>											
AMGK-090LX-02	1.8	3415	3.3	81	0.9	HS 5	2.7	2.8	7.0	0.0020	22
AMGK-090LB-02	2.6	3440	4.85	82	0.87	HS 5	3.1	3.2	6.9	0.0020	22
AMGK-100LB-02	3.6	3465	6.5	85	0.88	HS 5	2.8	3.1	7.1	0.0039	35
AMGK-112MB-02	4.8	3480	8.2	85.5	0.91	HS 5	3.0	3.6	7.3	0.0060	38
AMGK-132SB-02	6.5	3500	11.8	85.5	0.87	HS 5	3.0	3.2	6.7	0.0110	53
AMGK-132SD-02	8.6	3490	14.4	88	0.89	HS 5	2.9	3.4	7.0	0.0140	56
AMGK-160MB-02	13.2	3520	22	90.5	0.88	HS 5	2.5	2.9	6.2	0.0364	104
AMGK-160MD-02	18	3520	30.5	90.5	0.87	HS 5	3.0	3.1	6.3	0.045	106
AMGK-160LB-02	22	3520	35.5	91.2	0.89	HS 5	2.9	2.9	6.8	0.057	130
AMGK-180MB-02	26	3550	46.5	91.2	0.86	HS 5	2.1	2.8	6.8	0.094	162
AMGK-200LG-02	36	3555	56	93.5	0.91	HS 5	2.4	2.7	6.8	0.182	252
AMGK-200LJ-02	44	3560	69	94	0.89	HS 5	2.5	2.8	7.5	0.200	262
AMGK-225ME-02	54	3560	86	94	0.88	HS 5	2.2	2.6	7.1	0.247	305
AMGK-250ME-02	65	3570	105	94	0.86	HS 5	2.3	3.1	7.1	0.45	410
AMGK-280SG-02	86	3575	138	94.7	0.87	HS 4	2.1	2.1	6.5	0.88	555
AMGK-280MG-02	103	3570	163	95	0.88	HS 4	2.0	2.3	6.5	1.03	590
AMGK-315SB-02 <sup>1</sup>	120	3580	191	95	0.88	DS 4	1.9	2.5	6.5	1.61	735
AMGK-315MB-02 <sup>*1</sup>	143	3575	220	95.8	0.89	DS 4	2.0	2.4	6.4	1.91	835
AMGK-315MD-02 <sup>1</sup>	185	3580	285	95.8	0.89	DS 4	2.4	2.6	6.9	2.3	905
AMGK-315LB-02 <sup>*1</sup>	220	3580	335	96	0.89	DS 4	2.5	2.7	7.1	2.8	1085
AMGK-355MB-02	275	3580	425	96	0.89	DS 4	2.2	2.6	7.1	3.8	1360
AMGK-355LB-02	345	3580	535	96.6	0.88	DS 4	2.2	2.6	7.1	4.7	1580

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

<sup>1</sup> Type AMGK-315

We reserve us the right to deliver foot-mounted types (AMSK) in welded design.

(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).



**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection type “n”

440V – 60 Hz  
Class F insulation, Utilization to B  
Temperature class T3

**Types: AMGK      Number of poles: 4 – 60 Hz**

Type	Rated output	Rated speed	Rated current at	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	440V A	%	cos $\varphi$		with direct-on starting as a multiple of the				
							rated torque $M_A/M_N$	rated torque $M_K/M_N$	rated current $I_A/I_N$	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 1800 min<sup>-1</sup></b>											
AMGK-090LX-04	1.5	1685	3	79	0.84	HS 4	2.2	2.4	5.0	0.0036	22
AMGK-090LB-04	1.8	1710	3.65	80	0.82	HS 4	2.2	2.3	5.1	0.0036	22
AMGK-100LB-04	2.6	1700	5.3	81.5	0.84	HS 5	2.2	2.4	5.3	0.0051	35
AMGK-100LD-04	3.4	1700	6.6	82.6	0.84	HS 5	2.6	2.7	5.8	0.0066	38
AMGK-112MB-04	4.8	1720	8.8	85	0.84	HS 5	2.3	2.6	5.9	0.012	41
AMGK-132SB-04	6.6	1740	11.4	88	0.86	HS 5	2.2	2.6	6.8	0.022	59
AMGK-132MB-04	8.6	1735	15	88.5	0.85	HS 5	2.2	2.5	6.9	0.030	69
AMGK-160MB-04	13.2	1760	23	31	0.84	HS 5	2.6	2.5	6.2	0.068	108
AMGK-160LB-04	17	1750	29.5	91.2	0.84	HS 5	2.9	2.4	6.3	0.092	130
AMGK-180MB-04	22	1765	36.6	92	0.87	DS 5	2.9	2.4	6.3	0.13	162
AMGK-180LB-04	25	1765	41.5	92	0.86	DS 5	2.9	2.5	6.3	0.16	176
AMGK-200LG-04	36	1765	60	92.9	0.86	HS 5	2.5	2.4	6.4	0.25	254
AMGK-225SE-04	43	1770	73	93.2	0.84	HS 5	2.3	2.5	5.9	0.35	305
AMGK-225ME-04	52	1770	90	93.9	0.83	HS 5	2.8	2.7	6.8	0.41	335
AMGK-250ME-04	63	1780	103	94.5	0.85	HS 5	2.3	2.6	7.2	0.80	425
AMGK-280SG-04	85	1780	138	94.8	0.85	HS 5	2.3	2.6	6.6	1.44	585
AMGK-280MG-04	100	1780	161	95	0.87	HS 5	2.3	2.5	6.6	1.65	660
AMGK-315SB-04	126	1785	208	95.1	0.84	DS 4	2.2	2.3	6.5	2.4	795
AMGK-315MB-04	150	1785	245	95.5	0.85	DS 4	2.2	2.2	6.5	2.9	890
AMGK-315MD-04	180	1785	290	95.5	0.85	DS 4	2.2	2.2	6.8	3.4	960
AMGK-315LB-04	220	1785	360	95.8	0.84	DS 4	2.6	2.5	6.8	4.0	1165
AMGK-355MB-04	240	1790	385	95.8	0.85	DS 4	2.0	2.4	6.9	5.5	1520
AMGK-355MB-04*	275	1790	445	95.8	0.84	DS 4	2.1	2.5	6.9	5.5	1520
AMGK-355MB-04	275	1790	435	96.3	0.86	HS 2	1.0	2.4	6.9	5.5	1520
AMGK-355LB-04	300	1790	475	96.1	0.86	DS 4	1.9	2.2	6.8	6.8	1730
AMGK-355LB-04*	340	1790	545	96.4	0.85	DS 4	2.0	2.4	7.0	6.8	1730
AMGK-355LB-04	350	1792	560	96.7	0.85	HS 2	1.2	2.6	7.1	6.8	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection type “n”

440V – 60 Hz  
Class F insulation, Utilization to B  
Temperature class T4

**Types: AMGK      Number of poles: 6 – 60 Hz**

Type	Rated output	Rated speed	Rated current at	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	440V A	%	cos $\varphi$		with direct-on starting as a multiple of the				
							rated torque $M_A/M_N$	rated torque $M_K/M_N$	rated current $I_A/I_N$	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 1200 min<sup>-1</sup></b>											
AMGK-090LX-06	0.90	1095	2.3	69.0	0.75	HS 4	1.7	2.0	3.4	0.0036	22
AMGK-090LB-06	1.32	1100	3.4	73.5	0.74	HS 4	2.0	2.3	3.8	0.0036	22
AMGK-100LB-06	1.8	1140	4.5	78.0	0.74	HS 4	2.3	2.5	4.9	0.0086	35
AMGK-112MB-06	2.6	1150	5.8	83.0	0.73	HS 3	1.8	2.1	4.9	0.014	38
AMGK-132SB-06	3.6	1150	6.9	86.0	0.81	HS 4	2.1	2.6	6.0	0.030	59
AMGKA-132MB-06	4.8	1150	9.3	85.0	0.81	HS 4	2.3	2.6	6.0	0.033	67
AMGK-132MD-06	6.6	1150	12.8	86.5	0.80	HS 5	2.6	2.6	6.0	0.045	72
AMGK-160MB-06	9.0	1165	16.6	88.5	0.81	HS 5	2.2	2.7	6.5	0.100	108
AMGK-160LB-06	13.2	1160	23.5	89.5	0.82	HS 5	2.3	2.6	6.9	0.134	130
AMGK-180LB-06	18.0	1165	34	91.0	0.79	HS 4	1.5	2.5	5.8	0.13	176
AMGK-200LG-06	22	1170	40.5	91.5	0.79	DS 4	2.4	2.2	5.3	0.33	262
AMGK-200LJ-06	26	1170	48.5	91.6	0.79	DS 4	2.5	2.3	5.4	0.33	282
AMGK-225ME-06	36	1175	63	92.8	0.82	DS 4	2.4	2.1	5.9	0.55	315
AMGK-250ME-06	43	1185	77	93.2	0.80	DS 4	2.3	2.2	6.8	1.00	420
AMGK-280SG-06**	54	1185	89	93.0	0.86	DS 4	2.2	2.2	6.0	1.87	605
AMGK-280MG-06**	63	1185	103	93.5	0.86	DS 4	2.1	2.3	6.2	2.3	670
AMGK-315SB-06	85	1190	137	95.0	0.86	DS 4	2.1	2.2	6.7	3.3	795
AMGK-315MB-06	105	1190	168	95.4	0.85	DS 4	1.9	2.2	6.7	4.0	890
AMGK-315MC-06	132	1190	207	95.6	0.87	DS 4	2.1	2.3	6.8	4.9	960
AMGK-315MD-06	150	1190	235	95.8	0.87	DS 4	2.0	2.2	6.7	4.9	960
AMGK-315LB-06	170	1190	265	95.8	0.87	DS 4	2.0	2.1	6.7	6.0	1165
AMGK-355MB-06	230	1192	370	96.3	0.85	HS 2	1.1	2.4	6.4	7.8	1520
AMGK-355LB-06	280	1192	440	96.6	0.86	HS 2	1.1	2.4	6.3	8.9	1730

Higher outputs, other voltages and frequencies on request.

\*\* Larger laminated core possible, then higher output, on request.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

Protection type "n"

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: AMGK****Number of poles: 4 / 2****Types: AMGK****Number of poles: 6 / 2**

Type	Rated output	Rated speed	Rated current	Rotor class	Starting torque	Starting current	Moment of inertia	Net weight
			at 400V			with direct-on starting as a multiple of the rated current	J	
	kW	min <sup>-1</sup>	A		rated torque	rated current	kg m <sup>2</sup>	ca. kg

**Pole-changing for 2 speeds with 1 Dahlander-connected winding****Speed 1500/3000 min<sup>-1</sup>**

AMGK-112MB-42	3.6/4.3	1410/2870	7.8/8.7	HS 3	1.7/1.8	4.5/5.9	0.011	38
AMGK-132SB-42	4.9/6	1450/2915	9.8/12.1	HS 4	2.0/2.3	6.5/7.6	0.022	59
AMGK-132MB-42	6.5/9	1450/2920	13.5/17.3	HS 5	2.8/2.3	7.0/7.5	0.03	69
AMGK-160MB-42	9/11	1455/2920	17.8/21	HS 4/5	2.3/2.4	5.6/6.5	0.068	108
AMGK-160LB-42	13/16	1460/2930	26.1/31	HS 5	3.0/3.2	6.5/7.7	0.092	130
AMGK-180MB-42	16.5/20	1465/2940	31/37	HS 5	2.5/2.4	5.8/6.9	0.13	162
AMGK-180LB-42	18.5/25	1465/2935	34.5/45	HS 5	2.6/2.2	5.7/6.2	0.16	176
AMGK-200LG-42	26/31	1470/2960	48/56	HS 5	2.5/2.6	6.6/8	0.25	254
AMGK-225SE-42	32/38	1475/2960	59/71	HS 5	2.2/2.7	6.5/7	0.34	305
AMGK-225ME-42	38/46	1475/2965	70/84	HS 5	2.8/3.3	7.3/8.5	0.41	335
AMGK-250ME-42	45/55	1465/2945	86/95	HS 4	2.1/2.0	5.0/6.5	0.79	425
AMGK-280SG-42	60/75	1475/2965	110/126	HS 4	2.0/1.8	5.7/6.6	1.43	575
AMGK-280MG-42	73/90	1480/2970	129/149	HS 4	2.0/1.7	5.9/7.8	1.66	650
AMGK-315SB-42 <sup>1</sup>	82/96	1485/2980	152/163	HS 4	2.0/2.1	6.0/7.0	1.8	795
AMGK-315MB-42 <sup>1</sup>	100/124	1485/2975	181/202	HS 2/3	1.3/1.3	5.5/6.8	2.1	890
AMGK-315MD-42 <sup>1</sup>	120/145	1485/2975	214/233	HS 2	1.3/1.3	5.5/6.8	2.5	960
AMGK-315LB-42 <sup>1</sup>	142/172	1485/2975	253/276	HS 2	1.3/1.3	5.6/6.8	3.0	1165
AMGK-355MB-42	150/200	1485/2985	275/335	HS 3	1.6/1.6	5.0/6.8	4.3	1520
AMGK-355LB-42	180/250	1485/2985	355/420	HS 2	1.2/1.3	5.0/6.8	5.3	1730

**Pole-changing for 2 speeds with 2 separate windings****Speed 1000/1500 min<sup>-1</sup>**

AMGK-112MB-64	1.5/2.2	960/1450	4.1/4.8	HS 4	2.2/1.7	5.0/5.8	0.011	38
AMGK-132SB-64	2.2/3.3	960/1460	6.1/7.4	HS 4/5	1.9/2.0	5.0/6.8	0.024	59
AMGK-132MB-64	3/4.5	965/1465	7.5/9	HS 4	2.4/2.1	6.1/7.5	0.03	69
AMGK-160MB-64	4.5/6.5	965/1465	9.4/12.8	HS 4	1.9/1.8	5.7/7.4	0.068	108
AMGK-160LB-64	6.5/9.5	970/1460	13.5/17.8	HS 4	2.0/1.8	6.5/6.9	0.092	130
AMGK-180LB-64	11/16	970/1460	23/30	HS 3	1.9/1.7	6.0/6.8	0.13	176
AMGK-200LG-64	13/19	970/1460	27/34	DS 4	2.9/2.3	6.0/6.5	0.25	254
AMGK-200LJ-64	15/23	975/1470	31/41	DS 5	2.8/2.4	6.4/6.8	0.25	254
AMGK-225SE-64	18/27	975/1470	40/51	DS 5/4	2.8/2.2	5.2/5.7	0.34	305
AMGK-225ME-64	21/31	980/1480	44/58	DS 5	2.8/2.2	5.5/6.0	0.41	335
AMGK-250ME-64	28/40	980/1480	55/72	HS 5/4	2.8/2.0	6.3/7.0	0.79	425
AMGK-280SG-64	43/65	985/1485	78/114	HS 4	2.0/1.9	5.6/6.8	1.7	575
AMGK-280MG-64	52/78	985/1485	95/137	HS 4	2.2/2.0	6.0/6.9	2.0	650
AMGK-315SB-64*	60/90	985/1485	120/160	DS 5/4	2.8/2.2	5.8/6.1	2.3	795
AMGK-315MB-64*	70/100	985/1485	140/179	HS 5	2.8/2.2	5.8/6.1	2.8	890
AMGK-315MD-64*	80/115	985/1485	150/200	DS 5/4	2.8/2.2	5.8/6.1	3.3	960
AMGK-315LB-64*	100/140	985/1485	187/245	DS 5/4	2.7/2.0	5.8/6.0	3.9	1165
AMGK-355MB-64	125/180	990/1490	235/315	HS 2	1.5/1.1	6.0/6.5	6.9	1520
AMGK-355LB-64	155/225	990/1490	290/390	HS 2	1.6/1.1	6.0/6.5	8.5	1730

Higher outputs, other voltages and frequencies on request.

<sup>1</sup> Type AMGK-315

We reserve us the right to deliver foot-mounted types (AMSK) in welded design.

(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

\* Utilization to insulation class F.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

Protection type "n"

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: AMGK****Number of poles: 8 / 4****Types: AMGK****Number of poles: 8 / 6**

Type	Rated output	Rated speed	Rated current	Rotor class	Starting torque	Starting current	Moment of inertia J	Net weight
			at 400V		with direct-on starting as a multiple of the			
	kW	min <sup>-1</sup>	A		rated torque	rated current	kg m <sup>2</sup>	approx. kg

**Pole-changing for 2 speeds with 1 Dahlander-connected winding****Speed 750/1500 min<sup>-1</sup>**

AMGK-112MB-84	1.4/2.2	710/1440	4.1/4.9	HS 3	1.9/1.7	3.8/4.8	0.0136	40
AMGK-132SB-84	2.3/3.4	715/1440	5.9/7.3	HS 3	1.8/1.7	4.2/5.0	0.033	59
AMGK-132MB-84	3/5	720/1460	8.3/11	HS 4	2.3/1.8	5.0/5.8	0.045	72
AMGK-160MB-84	4/5.5	710/1440	9/10.8	HS 3	1.4/1.6	4.0/5.3	0.091	104
AMGK-160MD-84	5/7.5	720/1440	11.3/15	HS 4	1.9/1.7	5.0/5.5	0.12	108
AMGK-160LB-84	7/11	720/1440	15.5/22.3	HS 4	1.9/1.7	5.5/5.6	0.16	130
AMGK-180LB-84*	11/18	725/1455	24.5/33.3	HS 4	2.1/2.0	5.5/6.7	0.19	176
AMGK-200LG-84	17/25	720/1450	39/44.5	HS 4	2.3/2.3	4.3/6.0	0.33	258
AMGK-225SE-84*	22/31	725/1470	54/56	HS 5	2.9/2.8	5.0/7.0	0.46	305
AMGK-225ME-84*	26/38	730/1470	59/67	HS 5	3.0/3.0	5.0/6.9	0.55	325
AMGK-250ME-84	32/46	740/1480	68/80	HS 5	2.6/2.5	6.0/7.5	1.0	415
AMGK-280SG-84	42/60	735/1480	85/103	HS 4	1.9/2.0	5.0/6.5	2.26	585
AMGK-280MG-84	50/72	740/1480	101/124	HS 5	2.2/2.3	5.0/7.1	2.88	640
AMGK-315SB-84	60/83	740/1485	135/141	HS 4	1.8/1.9	4.9/7.0	3.4	780
AMGK-315MB-84	72/110	740/1485	160/187	HS 4	1.7/1.9	4.8/7.2	4.0	875
AMGK-315MD-84	90/132	740/1485	190/221	HS 3/4	1.7/1.7	4.9/6.8	4.8	940
AMGK-315LB-84*	115/160	740/1490	242/266	HS 3/4	1.6/1.9	5.0/7.0	6.0	1145
AMGK-355MB-84	145/220	745/1490	305/370	HS 2	1.3/1.3	4.2/6.2	10	1560
AMGK-355LB-84	175/275	745/1490	370/460	HS 2	1.5/1.4	4.5/6.7	12	1730

**Pole-changing for 2 speeds with 2 separate windings****Speed 750/1000 min<sup>-1</sup>**

AMGK-112MB-86	1/1.4	720/965	3.5/3.9	HS 4	1.8/1.6	3.4/4.3	0.0167	38
AMGK-132SB-86	1.5/2	715/970	4.6/5.9	HS 4	2.0/1.9	4.3/5.5	0.033	59
AMGK-132MB-86	2.2/3	715/970	7.6/9.5	HS 5	2.7/2.5	5.6/6.0	0.045	72
AMGK-160MB-86	4/5.5	720/970	9.2/11.9	HS 4	2.3/1.9	5.7/6.0	0.094	108
AMGK-160LB-86	5.5/7.5	720/965	11.7/15.8	HS 4	2.2/1.9	6.0/6.3	0.13	130
AMGK-180LB-86	8.5/11	725/980	19.5/25.7	HS 4/3	1.6/1.5	5.4/5.8	0.19	176
AMGK-200LG-86*	14.5/19	715/975	30/37.5	HS 4	2.0/2.0	4.5/5.7	0.33	282
AMGK-225SE-86	16/21	720/980	35/44	DS 5	2.6/2.8	4.5/6.0	0.46	305
AMGK-225ME-86	19/25	725/975	42/52	DS 5	2.5/2.5	5.0/6.0	0.55	315
AMGK-250ME-86	24/32	735/985	50/62	DS 4	2.4/1.9	5.7/6.6	1.0	420
AMGK-280SE-86	33/44	740/990	67/83	HS 4/3	1.9/1.6	4.7/5.3	1.73	605
AMGK-280ME-86	40/53	740/990	83/99	HS 5	2.3/1.7	5.6/5.8	2.06	670
AMGK-315SB-86*	50/65	741/991	99/120	DS 5/4	2.5/1.5	6.6/6.3	3.38	795
AMGK-315MB-86	60/80	741/991	116/147	DS 4	2.4/1.3	6.9/6.6	4.06	890
AMGK-315MD-86*	70/95	741/991	135/171	DS 4	2.5/1.7	6.6/6.8	4.84	960
AMGK-315LB-86	80/110	742/991	154/197	DS 5/4	2.6/1.6	6.8/6.5	6.0	1165
AMGK-355MB-86*	115/150	741/991	220/265	HS 2	1.6/1.3	5.2/6.2	10	1520
AMGK-355LB-86*	140/180	741/991	265/320	HS 2	1.6/1.4	5.4/6.8	12	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

Protection type "n"

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: AVGK****Number of poles: 4 / 2****Fan design****Types: AVGK****Number of poles: 6 / 4****Fan design**

Type	Rated output	Rated speed	Rated current	Rotor class	Starting torque	Starting current	Moment of inertia J	Net weight
			at 400V		with direct-on starting as a multiple of the			
	kW	min <sup>-1</sup>	A		rated torque	rated current	kg m <sup>2</sup>	approx. kg

**Pole-changing for 2 speeds with 1 Dahlander-connected winding, Design for fan drive****Speed 1500/3000 min<sup>-1</sup>**

AVGK-112MB-42	1.1/4.1	1420/2895	2.2/8.1	HS 4	1.7/2.0	5.3/6.7	0.011	38
AVGK-132SB-42	1.6/6	1450/2925	3.35/12	HS 4	1.9/2.2	6.5/7.5	0.022	59
AVGK-132MB-42	2.2/9	1450/2920	4.5/17.3	HS 5	2.2/2.1	6.8/7.6	0.03	69
AVGK-160MB-42	3/12	1460/2900	5.9/23	HS 4	1.8/2.3	4.9/6.1	0.068	108
AVGK-160LB-42	4/16	1465/2930	8.5/31	HS 5	2.7/2.9	5.8/8	0.092	130
AVGK-180MB-42	5.5/20	1470/2950	10.5/38	HS 5	2.4/2.4	5.8/6.8	0.13	162
AVGK-180LB-42	6.3/25*	1465/2935	12/46	DS 4	2.4/2.6	5.3/7.0	0.16	176
AVGK-200LG-42	8.5/33	1470/2960	16.2/61	DS 4	2.0/2.3	5.7/6.8	0.25	254
AVGK-225SE-42	10.5/38	1475/2965	19.5/70	HS 5	2.9/3.0	6.4/7.9	0.34	305
AVGK-225ME-42	13/46	1480/2970	23.5/84	HS 5	2.4/2.8	6.8/7.9	0.41	335
AVGK-250ME-42	15/55	1470/2950	29/98	HS 4/5	2.1/2.4	5.2/7.0	0.79	425
AVGK-280SG-42	20/75	1480/2965	36/125	HS 3/4	1.6/2.0	5.3/7.0	1.3	575
AVGK-280MG-42	24/90	1480/2970	44/149	HS 4	1.9/2.2	5.6/7.5	1.66	650
AVGK-315SB-42 <sup>1</sup>	27/110	1485/2980	52/179	HS 3	1.4/1.3	5.0/6.2	1.8	795
AVGK-315MB-42 <sup>1</sup>	33/132	1485/2980	62/215	HS 3	1.4/1.3	5.0/6.2	2.1	890
AVGK-315MD-42 <sup>1</sup>	37/145	1485/2980	70/235	HS 3	1.5/1.4	5.2/6.8	2.5	960
AVGK-315LB-42 <sup>1</sup>	44/172	1485/2980	80/276	HS 3	1.3/1.2	5.6/6.8	3.0	1165
AVGK-355MB-42	50/200	1485/2985	95/335	HS 2	1.2/1.3	5.0/6.8	4.3	1520
AVGK-355LB-42	65/250	1485/2985	125/420	HS 2	1.2/1.3	5.0/6.8	5.3	1730

**Pole-changing for 2 speeds with 2 separate windings, Design for fan drive****Speed 1000/1500 min<sup>-1</sup>**

AVGK-112MB-64	0.9/3	950/1445	2.3/7	HS 3/4	1.8/1.9	5.0/6.0	0.011	38
AVGK-132SB-64	1.25/4.2	965/1455	3.1/9.0	HS 3/4	1.6/2.3	4.6/6.0	0.024	59
AVGK-132MB-64	1.65/5.5	955/1460	3.7/11.2	HS 3/4	1.4/1.9	5.0/7.0	0.03	69
AVGK-160MB-64	2.2/7.5	975/1470	5.4/15.2	HS 4	2.2/2.2	5.1/6.0	0.068	108
AVGK-160MD-64	3/9	970/1470	7.1/18	HS 4	2.3/2.2	4.4/6.2	0.068	108
AVGK-160LB-64	3.5/12	985/1465	9.5/24	HS 5	2.4/2.6	5.6/6.8	0.092	130
AVGK-180MB-64	4.5/14	970/1460	11.1/26.5	HS 4	1.7/1.7	6.0/7.0	0.11	162
AVGK-180LB-64	5.5/16.5	975/1460	11.8/32	HS 4	1.8/1.6	6.2/6.0	0.13	176
AVGK-200LG-64	7/20	970/1465	13.7/35	HS 4	2.3/2.0	5.8/6.5	0.25	254
AVGK-200LJ-64	9/26	975/1465	18.6/47.5	HS 5	2.5/2.5	5.7/6.9	0.25	254
AVGK-225SE-64	10/31	985/1480	21.5/60	DS 5	2.8/3.0	6.0/6.9	0.34	305
AVGK-225ME-64	13/38	985/1480	26.6/70	DS 4/5	2.3/2.7	5.5/7.0	0.41	335
AVGK-250ME-64	17/48	985/1480	34/87	HS 5	2.3/2.4	6.2/7.5	0.79	425
AVGK-280SG-64	25/70	988/1485	45/126	HS 4	1.9/1.7	5.5/6.9	1.7	575
AVGK-280MG-64	30/82	988/1485	53/142	HS 4	1.9/1.8	5.5/6.5	2.1	650
AVGK-315SB-64	32/95	985/1485	61/168	HS 4	2.2/2.2	5.3/5.6	2.3	795
AVGK-315MB-64	37/115	985/1485	70/200	DS 4	2.2/2.0	5.3/5.6	2.8	890
AVGK-315MD-64	47/135	985/1485	89/236	DS 4	2.2/2.2	5.3/6.5	3.3	960
AVGK-315LB-64*	55/160	985/1485	105/280	DS 5	2.8/2.8	6.5/7.0	3.9	1165
AVGK-355MB-64	75/200	990/1490	140/350	HS 2	1.5/1.2	6.0/6.5	6.9	1520
AVGK-355LB-64	90/250	995/1490	165/430	HS 2	1.6/1.2	6.0/6.5	8.5	1730

Higher outputs, other voltages and frequencies on request.

<sup>1</sup> Type AVGK-315

We reserve us the right to deliver foot-mounted types (AVSK) in welded design.

(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

\* Utilization to insulation class F.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

Protection type "n"

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: AVGK****Number of poles: 8 / 4****Fan design****Types: AVGK****Number of poles: 8 / 6****Fan design**

Type	Rated output	Rated speed	Rated current	Rotor class	Starting torque	Starting current	Moment of inertia J	Net weight
			at 400V			with direct-on starting as a multiple of the		
	kW	min <sup>-1</sup>	A		rated torque	rated current	kg m <sup>2</sup>	approx. kg

**Pole-changing for 2 speeds with 1 Dahlander-connected winding, Design for fan drive****Speed 750/1500 min<sup>-1</sup>**

AVGK–112MB–84	0.9/3.7	710/1450	3.6/9.2	HS 3/5	1.8/2.1	3.6/5.9	0.011	38
AVGK–132SB–84	1.3/5	720/1455	4.2/10.7	HS 3/5	1.6/2.7	3.5/6.9	0.022	59
AVGK–132MB–84	1.7/6.8	720/1460	5.2/14.3	HS 3/5	1.8/2.3	4.4/7.0	0.03	69
AVGK–160MB–84	3/10	725/1475	9.7/22.3	HS 4/5	1.9/2.8	3.5/6.6	0.068	108
AVGK–160LB–84	3.5/13	730/1475	11.8/29.5	HS 3/5	1.9/2.7	3.8/7.0	0.092	130
AVGK–180MB–84	4/16	735/1470	13.1/30	DS 4	1.9/2.3	4.6/6.0	0.13	162
AVGK–180LB–84	5/20	725/1470	13.8/39	DS 4/5	2.1/2.5	3.3/6.1	0.16	176
AVGK–200LG–84	7/28	720/1450	15.2/52	HS 4/5	2.2/2.4	4.6/6.3	0.33	254
AVGK–225SE–84	8/33	725/1465	17.4/59	DS 5	2.4/2.5	4.5/6.5	0.46	305
AVGK–225SF–84*	9.2/37	720/1460	20.5/67	HS 4	2.1/2.3	4.2/6.0	0.46	305
AVGK–225ME–84	9.5/39	730/1475	21/72	HS 4/5	2.6/3.0	5.1/7.0	0.55	335
AVGK–225MF–84*	11/44	730/1470	24/78	HS 4/5	2.6/3.0	5.0/7.5	0.41	335
AVGK–250ME–84	11/49	735/1475	23/84	HS 5	2.4/2.5	5.5/7.3	1.0	425
AVGK–280SG–84	17/68	735/1480	43.5/125	HS 4	1.7/2.0	4.0/7.3	1.3	575
AVGK–280MG–84	20/80	740/1485	48/140	HS 3/4	1.7/2.0	4.1/7.5	1.6	650
AVGK–315SB–84	22/95	740/1485	45/163	HS 3/5	1.6/1.8	4.9/7.0	3.4	780
AVGK–315MB–84*	26/115	740/1485	52/196	HS 3/4	1.5/1.8	4.4/6.8	4.0	875
AVGK–315MD–84	30/132	740/1485	60/221	HS 3/4	1.5/1.9	4.7/6.8	4.8	940
AVGK–315LB–84*	38/165	740/1490	74/276	HS 3/4	1.6/2.0	4.8/6.9	6.0	1145
AVGK–355MB–84	50/220	740/1490	100/370	HS 2	1.3/1.3	4.2/6.2	10	1560
AVGK–355LB–84	60/275	740/1490	120/460	HS 3	1.4/1.4	4.5/6.7	12	1730

**Pole-changing for 2 speeds with 2 separate windings, Design for fan drive****Speed 750/1000 min<sup>-1</sup>**

AVGK–112MB–86	0.8/1.9	725/965	3.1/5.6	HS 3	1.6/1.9	3.7/4.9	0.017	38
AVGK–132SB–86	1.1/2.6	720/970	3.3/6.9	HS 3/4	1.3/2.0	3.8/6.1	0.033	59
AVGK–132MB–86	1.6/3.8	710/965	5/10	HS 5	2.6/2.8	3.3/5.3	0.045	72
AVGK–160MB–86	2.5/6	720/965	6.1/12.6	HS 4	2.4/1.8	6.2/6.4	0.094	108
AVGK–160LB–86	3.5/8	730/970	8.9/16.9	HS 4	2.0/1.9	6.0/6.3	0.127	130
AVGK–180LB–86	5.5/12.5	730/970	14.2/27	HS 3	1.7/1.5	4.7/5.1	0.19	176
AVGK–200LG–86	9.5/20	730/975	21/42	HS 4	2.4/2.5	5.2/6.2	0.33	282
AVGK–225SE–86	11/24	730/980	24/55	HS 4	2.3/2.7	4.9/6.2	0.46	305
AVGK–225ME–86	13/28	730/980	27/54	HS 4/5	2.3/2.5	4.8/6.2	0.55	315
AVGK–250ME–86	16/34	735/985	31/62	HS 3	1.8/1.7	5.5/6.5	1.0	420
AVGK–280SG–86	25/50	740/990	50/96	HS 4	2.1/1.8	5.5/6.0	1.7	605
AVGK–280MG–86	30/60	740/990	60/115	HS 4	2.1/1.9	5.9/6.0	2.06	670
AVGK–315SB–86	33/70	742/990	65/126	DS 4	2.5/1.6	6.7/6.1	3.38	795
AVGK–315MB–86	40/85	742/990	78/152	DS 4	2.7/1.6	6.9/6.3	4.06	890
AVGK–315MD–86	47/100	741/990	90/180	DS 4	2.4/1.6	6.6/6.1	4.84	960
AVGK–315LB–86	55/120	742/990	105/214	DS 4	2.6/1.6	6.9/6.5	6.0	1165
AVGK–355MB–86	70/150	741/991	135/265	HS 2	1.5/1.2	5.4/6.0	10	1520
AVGK–355LB–86	85/190	741/991	160/335	HS 2	1.5/1.4	5.8/6.3	12	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

Protection type "n"

400V, – 50 Hz

Class F insulation, Utilization to B

**Types: AMGK      Number of poles: 8 / 6 / 4      Fan design****Types: AVGK      Number of poles: 8 / 6 / 4      Fan design**

Type	Rated output	Rated speed	Rated current	Rotor class	Starting torque	Starting current	Moment of inertia	Net weight
			at 400V		with direct-on starting as a multiple of the rated torque	rated current	J	
	kW	min <sup>-1</sup>	A				kg m <sup>2</sup>	approx. kg

**Pole-changing for 3 speeds with 2 separate windings, one of which is Dahlander-connected****Speed 750/1000/1500 min<sup>-1</sup>**

AMGK-112MB-33	0.9/1.1/1.5	700/960/1455	3.5/3.7/3.6	HS 3	1.7/1.5/1.4	3.4/4.1/5.5	0.0117	38
AMGK-132SB-33	1.3/1.6/2.2	720/975/1460	3.9/4.6/4.8	HS 4	1.9/2.0/1.8	3.7/4.5/6.0	0.033	59
AMGK-132MB-33	2.2/2.5/3.6	705/960/1445	7/7/7.6	HS 4	2.3/2.0/2.3	3.9/5.1/6.4	0.045	72
AMGK-160MB-33	3.3/4/5.5	725/975/1450	7.5/8.4/10.5	HS 4	2.1/2.0/1.6	5.8/5.9/6.3	0.094	108
AMGK-160LB-33	4.5/6/8	725/975/1455	10/12.2/14.5	HS 4	2.2/1.6/1.6	6.1/6.2/6.7	0.13	130
AMGK-180MB-33	6/8/11	725/975/1460	16/20/21	HS 4	2.1/1.9/1.4	6.2/6.5/6.2	0.16	162
AMGK-180LB-33	7/9/14	730/980/1460	17.6/22/25.5	HS 4	2.3/2.0/1.4	6.4/6.8/6.2	0.19	176
AMGK-200LG-33	12/15/18.5	730/960/1450	27/32.5/33	DS 4	2.5/1.8/2.2	4.7/5.1/6.2	0.33	262
AMGK-225SE-33	16/20/26	725/980/1465	40/42.8/46.5	DS 4	2.5/2.2/2.2	5.0/6.1/6.5	0.46	305
AMGK-225ME-33*	19/22/30	725/980/1460	41/44/52	DS 4	2.5/2.3/2.0	5.1/6.3/6.2	0.55	315
AMGK-250ME-33	24/28/36	735/990/1480	50/57/62	DS 4	2.6/2.4/2.3	5.5/6.6/6.8	1.1	420
AMGK-280SG-33	31/37/50	740/990/1480	65/70/84	DS 4	1.8/1.4/1.6	5.0/5.5/6.4	1.73	605
AMGK-280MG-33	37/45/60	740/990/1480	80/87/102	DS 4	2.0/1.7/1.9	5.1/5.7/6.5	2.1	670
AMGK-315SB-33	43/55/68	740/990/1480	92/106/114	HS 3	1.5/1.5/1.5	5.5/6.3/6.9	3.65	795
AMGK-315MB-33	50/65/80	740/990/1480	100/123/133	HS 3	1.5/1.3/1.4	5.5/6.4/6.9	4.2	890
AMGK-315MD-33	60/75/95	740/990/1480	125/143/157	HS 3	1.5/1.3/1.4	5.6/6.5/7.0	4.7	960
AMGK-315LB-33	70/90/110	740/990/1485	150/171/181	HS 3	1.5/1.3/1.4	5.7/6.6/7.0	5.9	1165

**Pole-changing for 3 speeds with 2 separate windings, one of which is Dahlander-connected, design for fan drive****Speed 750/1000/1500 min<sup>-1</sup>**

AVGK-112MB-33	0.6/0.85/2.4	715/980/1460	2/3.2/6.2	HS 3	1.6/2.1/1.6	3.2/4.2/5.1	0.0114	38
AVGK-132SB-33	0.75/1.3/3.7	730/980/1460	2.66/3.6/7.8	HS 3	1.8/1.5/1.4	4.4/5.3/6.7	0.022	59
AVGK-132MB-33	1/1.5/4.4	730/985/1470	4.2/5.8/10	HS 3	2.2/2.0/1.8	4.1/4.9/7.6	0.03	72
AVGK-160MB-33	1.6/2.2/6.6	725/980/1470	5.2/5.7/13.1	HS 4	2.0/1.9/2.0	3.6/5.1/6.5	0.068	108
AVGK-160LB-33	2.1/3.1/9	730/980/1470	6.7/8.1/17.6	HS 4	2.3/2.1/2.3	4.1/5.6/8.1	0.092	130
AVGK-180MB-33	3/4.5/13	725/985/1455	6.4/11.5/25	HS 4	1.9/1.9/1.9	5.2/6.4/6.5	0.158	162
AVGK-180LB-33	3.7/5.5/16	720/985/1455	8.4/15.7/32	HS 4	2.0/2.0/2.9	5.3/6.9/7.1	0.19	176
AVGK-200LG-33	5/7/20	725/980/1465	10.5/14.3/38	HS 4	2.3/1.8/2.6	5.2/6.0/6.7	0.33	262
AVGK-225SE-33	6/9/27	730/985/1470	12.8/19.5/47.5	HS 5	2.7/2.0/2.7	5.6/6.8/7.0	0.46	305
AVGK-225ME-33	7/10.5/32	735/985/1470	15.2/23.8/59	HS 5	2.7/1.8/2.2	5.0/5.1/6.0	0.55	315
AVGK-250ME-33	8/12/35	735/990/1475	17.1/24.7/60	HS 5	2.2/1.6/2.3	5.0/6.0/7.4	1.0	420
AVGK-280SG-33	14/21/60	740/990/1480	26.6/37/95	DS 4	1.4/1.3/1.8	4.6/5.8/7.0	1.7	605
AVGK-280MG-33	17/25/70	735/990/1480	34.2/48.5/119	DS 4	1.6/1.5/1.7	4.3/5.4/6.3	2.1	670
AVGK-315SB-33	18/26.5/75	740/990/1480	38/55/126	HS 3	1.4/1.3/1.5	5.0/5.5/7.0	3.65	795
AVGK-315MB-33	21.5/32/90	735/990/1480	41.8/62.7/150	HS 2	1.3/1.2/1.3	4.8/6.5/6.5	4.2	890
AVGK-315MD-33	25/37/105	740/990/1485	52.3/77/176	HS 2	1.3/1.3/1.6	5.2/6.5/7.5	4.7	960
AVGK-315LB-33*	31/45/132	740/990/1485	64.6/94/222	HS 2	1.3/1.2/1.5	5.5/6.8/7.6	5.9	1165

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

**Dimension drawings for motors and terminal box**

**See**  
**Series A..., E... Dimension drawings**  
**Page 86**

For the mounting types IM B3, IM B5 and IM B35 with terminal box on top the single dimension drawings are available in the output tables of the CD version (not in the printed version of this technical list).



# Series ENGV / EMGV, Increased Safety “e”

## Electrical design

### Electrical design

The motors of the series ENGV and EMGV (totally enclosed fan-cooled, see type code on page 11) are available both in standard design (ENG V) and in mechanical VIK design (EMGV).

Mechanical VIK design means that the motor construction meets the requirements of the VIK (Verband der Industriellen Energie- und Kraftwirtschaft e.V. – Committee of the Industrial Power and Power Utilities).

On customer request these motors can be delivered for a fixed voltage (e.g. 400V) or for a voltage range (e.g. 380–420V).

The rated voltages

400V or 380–420V

500V or 475–525V

690V or 655–725V

are standard voltages for 50 Hz systems. Other voltages and frequencies are possible on request. The outputs and electrical data indicated in the tables can be changed by special designs, achieving e.g. an even higher efficiency or a longer time of temperature rise  $t_E$  by means of a rotor with copper cage instead of aluminium die cast.

The insulation system of this motor series is suitable for mains voltages up to 1000V. The connecting (terminal box, terminals) up to including frame size 160 is designed for rated voltages up to 750V, in case of the frame sizes 180 – 355 for rated voltages up to 1100V.

The motors are fitted with 6 terminals, allowing “star” (Y) or “delta” (Δ) connection. Standard connection of all 400V motors is delta and therefore suitable for 400V Δ/690V Y.

The 500V motors are available

both for 500V Y and 500V Δ, if not for winding reasons one of the both versions is to be preferred.

The motors of the series E.GV have the winding executed in class F insulation, thermal utilization only to class “B”.

In accordance with the latest standard EN 60034-1 the thermal utilization, if it is inferior to the insulation class, will be stamped on the rating plate additionally to the insulation class. Therefore the motors of these series will be stamped with “F–B”. Only few exceptions require “F”. These are marked in the output tables with an \* and stamped with “F”.

Both for a fixed voltage (e.g. 400V, 500V or 690V) and for a voltage range (e.g. 380–420V, 475–525V or 655–725V) a tolerance of  $\pm 5\%$  for the “Range A” is admissible to EN 60034-1 (“VDE 0530”).

This results in the following: For the fixed voltage motor, e.g. 400V, this “Range A” goes from 380–420V. Within this range the motor must be reliably functioning in continuous duty, the temperature rise of the winding at the tolerance limits is allowed to be approx. 10 K higher than the limit value of the insulation class.

The electrical data (“Rated data”) always refer to the mean range, e.g. to 400V. Here the temperature rise of the winding is measured and the thermal utilization is determined.

The upper and lower limit of “Range A” is joined by “Range B”: Range “B” is inadmissible for EEx e motors. (see respective chart, i.e. example on page 22 of this technical list).

For the voltage range motors (e.g. 380–420V) of the series E.G. it is to be proceeded as follows.

The electrical data are measured in the mean range (e.g. at 400V) and at rated output. Obtained are the power factor, efficiency, speed (torque), starting current ( $I_A$  absolute), noise, torque characteristic and no-load data.

All guaranteed data indicated in this list or in the data sheet must meet within the tolerances these measured values at mid-voltage.

Maintaining the torque calculated from the rated output and the rated speed (“rated torque”), both currents at the limits of the rated voltage (e.g. at 380V and at 420V) are still to be determined now.

The maximum current from the rated voltage range (e.g. 380–420V) is determined and stamped onto the rating plate. (For the fixed voltage motor only the “mid-current”, which means e.g. at 400V, is decisive). However, for rating and Ex-approval of the voltage range motor this means that the worst value within the voltage range (at maximum current of this range) is decisive for the temperature rise of the motor and the time of temperature rise  $t_E$ .

The stamped-on currents of the voltage range motor are on average by approx. 5% higher than those of the fixed voltage motor of the same output. Therefore the value of the relative starting current “ $I_A/I_N$ ” is lower by approx. 5%.

Due to the more unfavourable conditions at determination of the time of temperature rise  $t_E$ , that one is a bit lower for the voltage range motor than for the single-voltage motor of the same type.

## Series ENGV / EMGV, Output tables

### Three-phase motors with squirrel cage

Totally enclosed fan-cooled, enclosure IP 55

Protection type "Increased Safety" EEx e II

Types: ENGV / EMGV

Number of poles: 2 – 50 Hz

400V – 50 Hz

Class F insulation, Utilization to B

Temperature class T3

Type	Rated output	Rated speed	Rated current at	Efficiency	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque rated torque	Starting current rated current	Time of temperature rise t <sub>E</sub> T3	Moment of inertia J <sub>M</sub>	Weight
	kW	min <sup>-1</sup>	400V A	%	cosφ		M <sub>A</sub> /M <sub>N</sub>	M <sub>K</sub> /M <sub>N</sub>	I <sub>A</sub> /I <sub>N</sub>	sec.	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 3000 min<sup>-1</sup></b>												
E.GV-090LX-02	1.3	2860	2.8	80	0.86	HS 5	3.1	3.3	7.0	11	0.0020	22
E.GV-090LB-02	1.85	2850	3.7	82	0.86	HS 5	3.1	3.2	7.8	8	0.0020	22
E.GV-100LB-02	2.5	2875	4.8	83.5	0.90	HS 4	2.2	2.5	7.2	11	0.0039	35
E.GV-112MD-02	3.3	2880	5.9	86	0.94	HS 4	2.4	3.2	7.5	15	0.0075	38
E.GV-132SD-02	4.6	2910	8.4	87.9	0.90	HS 5	2.7	3.2	7.4	10	0.0140	56
E.GV-132SX-02	5.5	2910	10.2	88.6	0.88	HS 5	2.9	3.2	7.6	9	0.0150	60
E.GV-160MB-02	7.5	2940	13.6	90.1	0.88	HS 5	3.0	3.2	7.3	13	0.0364	104
E.GV-160MD-02	10	2945	17.9	91.1	0.89	HS 4	2.0	2.8	6.7	17	0.045	106
E.GV-160LB-02	12.5	2945	22.5	91.9	0.88	HS 4	2.2	3.0	6.9	14	0.057	130
E.GV-180MB-02	15	2950	27.5	89	0.88	HS 4	1.9	2.5	6.6	15	0.094	162
E.GV-200LG-02	20	2965	37	91	0.86	HS 3	1.6	3.3	7.3	16	0.182	252
E.GV-200LJ-02	24	2960	43	92.9	0.87	HS 3	1.3	2.8	6.9	19	0.200	262
E.GV-225MB-02	28	2970	48.5	93.1	0.90	HS 4	2.1	2.5	7.2	10	0.247	305
E.GV-250MB-02	36	2970	61	94	0.91	HS 2	1.2	2.6	6.4	15	0.45	410
E.GV-280SG-02	47	2980	80	92.9	0.91	HS 2	1.5	2.7	7.4	13	0.88	555
E.GV-280MG-02	58	2980	97	94.6	0.92	HS 2	1.3	2.4	7.1	12	1.03	590
E.GV-315SA-02 <sup>1</sup>	68	2987	115	94.8	0.90	HS 2	1.1	2.6	6.7	25	1.61	735
E.GV-315SB-02 <sup>1</sup>	80	2987	136	94.8	0.90	HS 2	1.1	2.5	6.7	25	1.61	735
E.GV-315MB-02 <sup>1</sup>	100	2988	168	95.6	0.90	HS 2	1.1	2.5	7.1	21	1.91	835
E.GV-315MD-02 <sup>1</sup>	130	2985	210	95.9	0.93	HS 2	0.8	1.8	6.0	17	2.30	905
E.GV-315LB-02 <sup>1</sup>	150	2984	245	96	0.92	HS 2	1.0	2.4	6.5	14	2.80	1085
E.GV-355MB-02	185	2985	305	96	0.91	HS 2	0.9	2.3	6.6	14	2.60	1570
E.GV-355LB-02	220	2982	360	96.1	0.92	HS 2	1.2	2.6	6.0	14	3.16	1820

Higher outputs, other voltages and frequencies on request.

For motors still uncertified by the PTB modifications are possible.

<sup>1</sup> Type E.GV-315

We reserve us the right to deliver foot-mounted types (E.SV) in welded design.

(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection type "Increased Safety" EEx e II

**400V – 50 Hz**  
Class F insulation, Utilization to B  
**Temperature class T3**

**Types: ENGV / EMGV      Number of poles: 4 – 50 Hz**

Type	Rated output	Rated speed	Rated current at 400V	Efficiency	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque rated torque	Starting current rated current	Time of temperature rise $t_E$ T3	Moment of inertia $J_M$	Weight
	kW	min <sup>-1</sup>	A	%	cosφ		$M_A/M_N$	$M_K/M_N$	$I_A/I_N$	sec.	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 1500 min<sup>-1</sup></b>												
E.GV-090LX-04	1.0	1410	2.3	75.2	0.83	HS 5	2.5	2.7	5.4	13	0.0036	22
E.GV-090LB-04	1.35	1425	3.2	78	0.79	HS 5	2.6	3.0	6.2	10	0.0036	22
E.GV-100LB-04	2.0	1410	4.4	80	0.82	HS 5	2.3	2.7	5.7	14	0.0051	35
E.GV-100LD-04	2.5	1410	5.4	81	0.83	HS 5	2.5	2.6	6.0	12	0.0066	38
E.GV-112MB-04	3.6	1425	7.5	84.3	0.82	HS 4	2.4	2.7	6.7	12	0.012	41
E.GV-132SB-04	5.0	1445	9.7	87.2	0.85	HS 5	2.4	2.5	7.3	13	0.022	59
E.GV-132MB-04	6.8	1440	13	88	0.86	HS 5	2.5	2.5	7.2	11	0.030	69
E.GV-160MB-04	10	1465	19.4	90.4	0.83	HS 4	2.1	3.1	7.8	12	0.068	108
E.GV-160LB-04	13.5	1460	26	91.2	0.84	HS 4	2.2	3.2	7.6	11	0.092	130
E.GV-180MB-04	15	1463	28	91.4	0.85	HS 4	2.1	3.0	7.1	13	0.13	162
E.GV-180LB-04	17.5	1465	31.5	91.8	0.88	HS 4	2.1	3.2	7.3	11	0.16	176
E.GV-200LG-04	24	1475	45	92.7	0.83	HS 4	2.0	3.5	7.9	14	0.25	254
E.GV-225SB-04	30	1478	55	93.5	0.84	HS 4	2.2	2.9	7.1	9	0.37	305
E.GV-225MB-04	36	1480	67	93.7	0.83	HS 4	2.1	2.8	7.4	9	0.44	335
E.GV-250MB-04	44	1490	79	94.8	0.85	SHS	1.4	2.6	7.3	16	0.80	425
E.GV-280SG-04	58	1491	107	94.8	0.82	HS 3	1.8	2.4	7.6	11	1.43	575
E.GV-280MG-04	70	1488	114	94.9	0.94	SHS	1.4	2.9	7.5	14	1.65	650
E.GV-315SB-04	90	1490	157	95.8	0.86	HS 2	1.0	2.4	6.5	13	2.34	795
E.GV-315MB-04	100	1489	177	95.8	0.85	HS 2	1.0	2.3	6.4	12	2.8	890
E.GV-315MD-04	125	1490	225	95.8	0.84	HS 2	1.1	2.3	6.2	13	3.3	960
E.GV-315LB-04	140	1490	245	96.1	0.86	HS 2	1.2	2.3	7.1	11	3.9	1165
E.GV-355MB-04	185	1491	330	96.1	0.84	HS 2	1.0	2.3	6.0	12	5.5	1650
E.GV-355LB-04	220	1492	390	96.3	0.84	HS 2	0.9	2.3	6.9	9	6.8	1885

Higher outputs, other voltages and frequencies on request.  
For motors still uncertified by the PTB modifications are possible.

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
 Protection type "Increased Safety" EEx e II

**400V – 50 Hz**  
 Class F insulation, Utilization to B  
 Temperature class T3

**Types: ENGV / EMGV      Number of poles: 6 – 50 Hz**

Type	Rated output	Rated speed	Rated current at	Efficiency	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Time of temperature rise $t_E$ T3	Moment of inertia $J_M$	Weight
	kW	min <sup>-1</sup>	400V A	%	cosφ		$M_A/M_N$	$M_K/M_N$	$I_A/I_N$	sec.	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 1000 min<sup>-1</sup></b>												
E.GV-090LX-06	0.65	890	1.8	66	0.79	HS 3	1.7	1.8	3.4	35	0.0036	22
E.GV-090LB-06*	0.95	900	2.65	68	0.77	HS 4	1.8	2.0	3.8	21	0.0036	22
E.GV-100LB-06	1.3	955	3.65	76	0.70	HS 4	2.4	2.7	5.0	26	0.0086	35
E.GV-112MB-06	1.9	945	4.5	80.3	0.75	HS 4	1.8	2.0	4.6	30	0.014	38
E.GV-132SB-06	2.6	965	5.5	84.5	0.81	HS 5	2.5	2.5	6.4	30	0.030	59
E.GV-132MB-06	3.5	955	7.4	84.7	0.81	HS 4	2.5	2.6	5.9	24	0.033	67
E.GV-132MD-06	4.8	955	10.1	86	0.80	HS 5	2.5	2.8	6.5	17	0.045	72
E.GV-160MB-06	6.6	965	13.5	87.2	0.81	HS 5	2.5	2.8	6.9	13	0.100	108
E.GV-160LB-06	9.7	970	19.3	88.6	0.82	HS 5	2.4	3.0	7.6	9	0.134	130
E.GV-180LB-06	13.2	970	27.5	89.8	0.77	HS 4	2.1	2.9	6.0	17	0.13	176
E.GV-200LG-06	16.5	980	31.5	91.1	0.83	HS 4	2.2	2.8	6.7	18	0.33	262
E.GV-200LJ-06	20	980	39	91.5	0.80	HS 5	2.4	2.8	7.0	13	0.33	282
E.GV-225MB-06	27	990	53	93	0.79	SHS	1.8	2.8	7.7	16	0.55	315
E.GV-250MB-06	33	985	62	92.7	0.83	SHS	1.7	2.6	6.4	10	1.1	420
E.GV-280SG-06	40	985	72	93	0.86	DS 4	2.2	2.2	6.2	14	2.3	605
E.GV-280MG-06	46	985	82	93.3	0.88	DS 4	2.2	2.5	6.6	9	2.9	715
E.GV-315SB-06	64	990	110	95.5	0.88	HS 2	1.2	2.3	6.3	23	2.7	795
E.GV-315MB-06	76	991	134	95.3	0.86	HS 2	1.2	2.3	6.0	27	3.2	890
E.GV-315MC-06	85	992	149	95.6	0.86	HS 2	1.3	2.3	6.1	17	3.8	960
E.GV-315MD-06	105	991	185	95.5	0.86	HS 2	1.3	2.3	6.3	10	3.8	960
E.GV-315LB-06	130	990	225	95.8	0.87	HS 2	1.3	2.3	6.5	10	4.7	1165
E.GV-355MB-06	170	993	295	96.1	0.87	HS 2	1.0	2.2	6.0	10	7.8	1740
E.GV-355LB-06	200	993	340	96.2	0.87	HS 2	1.0	2.2	6.3	9	9.1	1940

Higher outputs, other voltages and frequencies on request.  
 For motors still uncertified by the PTB modifications are possible.  
 \* Utilization to insulation class F.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection type "Increased Safety" EEx e II

**400V – 50 Hz**  
Class F insulation, Utilization to B  
**Temperature class T3**

**Types: ENGV / EMGV      Number of poles: 8 – 50 Hz**

Type	Rated output	Rated speed	Rated current at 400V	Efficiency	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque as a multiple of the rated torque	Starting current as a multiple of the rated current	Time of temperature rise $t_E$ T3	Moment of inertia $J_M$	Weight
	kW	min <sup>-1</sup>	A	%	cosφ		$M_A/M_N$	$M_K/M_N$	$I_A/I_N$	sec.	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 750 min<sup>-1</sup></b>												
E.GV-090LX-08	0.37	670	1.33	62	0.66	HS 3	1.6	1.9	2.6	80	0.0036	22
E.GV-090LB-08	0.55	680	1.82	65	0.66	HS 3	1.7	2.0	2.8	60	0.0036	22
E.GV-100LB-08	0.65	695	1.98	67.5	0.7	HS 4	2.0	2.1	3.8	40	0.0086	35
E.GV-100LD-08	0.95	690	2.75	70	0.73	HS 4	2.0	2.1	3.8	40	0.010	38
E.GV-112MB-08	1.3	700	3.4	73.8	0.75	HS 3	1.7	2.0	3.7	30	0.014	40
E.GV-132SB-08	1.9	715	4.85	81	0.70	HS 4	2.0	2.3	4.5	50	0.032	59
E.GV-132MB-08	2.6	715	6.5	83	0.70	HS 4	2.1	2.4	4.6	60	0.045	72
E.GV-160MB-08	3.5	720	7.7	84.6	0.78	HS 3	1.6	2.5	4.5	50	0.092	104
E.GV-160MD-08	4.8	720	11.1	85.6	0.73	HS 4	2.1	3.0	5.5	30	0.12	108
E.GV-160LB-08	6.6	725	15.1	87.6	0.72	HS 4	2.3	3.0	5.8	30	0.16	130
E.GV-180LB-08	9.7	710	20.5	87.6	0.81	HS 4	1.7	2.7	5.5	30	0.19	176
E.GV-200LG-08	13.2	725	28	89.3	0.76	HS 4	2.1	2.4	4.9	21	0.33	258
E.GV-225SB-08	16.5	730	35	89	0.76	HS 4	2.4	2.4	5.1	13	0.46	305
E.GV-225MB-08	20	730	42	90	0.76	DS 4	2.4	2.1	5.9	15	0.55	325
E.GV-250MB-08	27	735	56	90.3	0.78	DS 4	2.4	2.1	5.9	11	1.0	415
E.GV-280SG-08	33	740	65	92.3	0.79	DS 4	2.3	2.3	5.6	15	2.3	585
E.GV-280MG-08	40	740	76	92.5	0.82	DS 4	2.2	2.4	6.0	18	2.6	640
E.GV-315SB-08	50	745	102	93.8	0.76	HS 2	1.1	2.2	6.0	20	3.3	780
E.GV-315MB-08	68	740	138	94	0.76	HS 2	1.2	2.3	5.7	22	4.0	875
E.GV-315MC-08	75	742	140	94.5	0.82	HS 2	1.0	2.1	6.3	23	4.8	940
E.GV-315MD-08	85	740	160	94.5	0.82	HS 2	1.3	2.2	5.9	15	4.8	940
E.GV-315LB-08	100	740	186	94.6	0.82	HS 2	1.1	2.2	6.2	12	6.0	1145
E.GV-355MB-08	132	744	255*	95.2	0.82	HS 2	0.95	2.2	5.9	17	12.4	1725
E.GV-355LB-08	160	744	305*	95.5	0.82	HS 2	0.95	2.2	5.9	19	14.7	1990

Higher outputs, other voltages and frequencies on request.  
230V for frame sizes 315MD and 315LB on request.  
For motors still uncertified by the PTB modifications are possible.

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
 Protection type "Increased Safety" EEx e II

**380V–420V – 50 Hz**  
 Class F insulation, Utilization to B  
 Temperature class T3

**Types: ENGV / EMGV    Number of poles: 2 – Wide voltage range**

Type	Rated output	Rated speed	Rated current at 380V to 400V A	Efficiency %	Power factor cos φ	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque M <sub>A</sub> /M <sub>N</sub>	Breakd. torque with direct-on starting as a multiple of the rated torque M <sub>K</sub> /M <sub>N</sub>	Starting current as a multiple of the rated current I <sub>A</sub> /I <sub>N</sub>	Time of temperature rise t <sub>E</sub> T3 sec.	Moment of inertia J <sub>M</sub> approx. kgm <sup>2</sup>	Weight approx. kg
	kW	min <sup>-1</sup>										
<b>Speed 3000 min<sup>-1</sup></b>												
E.GV–090LX–02	1.3	2860	2.85	80	0.86	HS 5	3.1	3.3	6.8	10	0.0020	22
E.GV–090LB–02	1.85	2850	3.85	82	0.86	HS 5	3.1	3.2	7.5	8	0.0020	22
E.GV–100LB–02	2.5	2875	5.1	83.5	0.90	HS 4	2.2	2.5	6.8	10	0.0039	35
E.GV–112MD–02	3.3	2880	6.2	86	0.94	HS 4	2.4	3.2	7.1	14	0.0075	38
E.GV–132SD–02	4.6	2910	8.8	87.9	0.90	HS 5	2.7	3.2	7.0	9	0.014	56
E.GV–132SX–02	5.5	2910	10.6	88.6	0.88	HS 5	2.9	3.2	7.3	7	0.015	60
E.GV–160MB–02	7.5	2940	14.6	90.1	0.88	HS 5	3.0	3.2	6.8	13	0.0364	104
E.GV–160MD–02	10	2945	18.5	91.1	0.89	HS 4	2.0	2.8	6.5	16	0.045	106
E.GV–160LB–02	12.5	2945	23.5	91.9	0.88	HS 4	2.2	3.0	6.6	13	0.057	130
E.GV–180MB–02	15	2950	29	89	0.88	HS 4	1.9	2.5	6.3	14	0.094	162
E.GV–200LG–02	20	2965	39	91	0.86	HS 3	1.6	3.3	6.9	16	0.182	252
E.GV–200LJ–02	24	2960	45	92.9	0.87	HS 3	1.3	2.8	6.6	19	0.200	262
E.GV–225MB–02	28	2970	51	93.1	0.90	HS 4	2.1	2.5	6.9	9	0.247	305
E.GV–250MB–02	36	2970	64	94	0.91	HS 2	1.2	2.6	6.0	14	0.45	410
E.GV–280SG–02	47	2980	85	92.9	0.91	HS 2	1.5	2.7	7.0	12	0.88	555
E.GV–280MG–02	58	2980	102	94.6	0.92	HS 2	1.3	2.4	6.7	11	1.03	590
E.GV–315SA–02 <sup>1</sup>	68	2987	121	94.8	0.90	HS 2	1.1	2.6	6.4	25	1.61	735
E.GV–315SB–02 <sup>1</sup>	80	2987	142	94.8	0.90	HS 2	1.1	2.5	6.4	24	1.61	735
E.GV–315MB–02 <sup>1</sup>	100	2988	176	95.6	0.90	HS 2	1.1	2.5	6.8	20	1.91	835
E.GV–315MD–02 <sup>1</sup>	130	2985	220	95.9	0.93	HS 2	0.8	1.8	5.7	16	2.30	905
E.GV–315LB–02 <sup>1</sup>	150	2984	255	96	0.92	HS 2	1.0	2.4	6.2	13	2.80	1085
E.GV–355MB–02	185	2985	320	96	0.91	HS 2	0.9	2.3	6.3	14	2.60	1570
E.GV–355LB–02	220	2982	380	96.1	0.92	HS 2	1.2	2.6	5.7	13	3.16	1820

Higher outputs, other voltages and frequencies on request.

For motors still uncertified by the PTB modifications are possible.

<sup>1</sup> Type E.SV-315

We reserve us the right to deliver foot-mounted types (E.SV) in welded design.

(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection type "Increased Safety" EEx e II

**380V–420V – 50 Hz**  
Class F insulation, Utilization to B  
Temperature class T3

**Types: ENGV / EMGV    Number of poles: 4 – Wide voltage range**

Type	Rated output	Rated speed	Rated current at 380V to 400V A	Efficiency %	Power factor cosφ	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque M <sub>A</sub> /M <sub>N</sub>	Breakd. torque with direct-on starting as a multiple of the rated torque M <sub>K</sub> /M <sub>N</sub>	Starting current rated current I <sub>A</sub> /I <sub>N</sub>	Time of temperature rise t <sub>E</sub> T3 sec.	Moment of inertia J <sub>M</sub> approx. kgm <sup>2</sup>	Weight approx. kg
	kW	min <sup>-1</sup>										
<b>Speed 1500 min<sup>-1</sup></b>												
E.GV-090LX-04	1.0	1410	2.4	75.2	0.83	HS 5	2.5	2.7	5.2	13	0.0036	22
E.GV-090LB-04	1.35	1425	3.25	78	0.79	HS 5	2.6	3.0	6.1	10	0.0036	22
E.GV-100LB-04	2.0	1410	4.55	80	0.82	HS 5	2.3	2.7	5.4	13	0.0051	35
E.GV-100LD-04	2.5	1410	5.6	81	0.83	HS 5	2.5	2.6	5.8	10	0.0066	38
E.GV-112MB-04	3.6	1425	7.7	84.3	0.82	HS 4	2.4	2.7	6.5	10	0.012	41
E.GV-132SB-04	5.0	1445	10.1	87.2	0.85	HS 5	2.4	2.5	7.0	12	0.022	59
E.GV-132MB-04	6.8	1440	13.7	88	0.86	HS 5	2.5	2.5	6.9	9	0.030	69
E.GV-160MB-04	10	1463	20.5	90.4	0.83	HS 4	2.1	3.1	7.5	11	0.068	108
E.GV-160LB-04	13.5	1460	27	91.2	0.84	HS 4	2.2	3.2	7.3	10	0.092	130
E.GV-180MB-04	15	1463	29	91.4	0.85	HS 4	2.1	3.0	6.8	11	0.13	162
E.GV-180LB-04	17.5	1465	32.5	91.8	0.88	HS 4	2.1	3.2	7.1	10	0.16	176
E.GV-200LG-04	24	1475	46.5	92.7	0.83	HS 4	2.0	3.5	7.6	13	0.25	254
E.GV-225SB-04	30	1478	57	93.5	0.84	HS 4	2.2	2.9	6.8	8	0.37	305
E.GV-225MB-04	36	1480	69	93.7	0.83	HS 4	2.1	2.8	7.2	8	0.44	335
E.GV-250MB-04	44	1490	81	94.8	0.85	SHS	1.4	2.6	7.1	14	0.80	425
E.GV-280SG-04	58	1490	111	94.8	0.82	HS 3	1.8	2.4	7.3	9	1.43	575
E.GV-280MG-04	70	1488	120	94.9	0.94	SHS	1.4	2.9	7.1	12	1.65	650
E.GV-315SB-04	90	1490	165	95.8	0.86	HS 2	1.0	2.4	6.2	12	2.34	795
E.GV-315MB-04	100	1489	186	95.8	0.85	HS 2	1.0	2.3	6.1	11	2.8	890
E.GV-315MD-04	125	1490	235	95.8	0.84	HS 2	1.1	2.3	5.9	12	3.3	960
E.GV-315LB-04	140	1490	255	96.1	0.86	HS 2	1.2	2.3	6.8	10	3.9	1165
E.GV-355MB-04	185	1491	345	96.1	0.84	HS 2	1.0	2.3	5.7	11	5.5	1650
E.GV-355LB-04	220	1492	405	96.3	0.84	HS 2	0.9	2.3	6.6	9	6.8	1885

Higher outputs, other voltages and frequencies on request.  
For motors still uncertified by the PTB modifications are possible.

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
 Protection type “Increased Safety” EEx e II

**380V–420V – 50 Hz**  
 Class F insulation, Utilization to B  
 Temperature class T3

**Types: ENGV / EMGV      Number of poles: 6 – Wide voltage range**

Type	Rated output	Rated speed	Rated current at 380V to 400V A	Efficiency %	Power factor cos φ	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque M <sub>A</sub> /M <sub>N</sub>	Breakd. torque rated torque M <sub>K</sub> /M <sub>N</sub>	Starting current rated current I <sub>A</sub> /I <sub>N</sub>	Time of temperature rise t <sub>E</sub> T3 sec.	Moment of inertia J <sub>M</sub> approx. kgm <sup>2</sup>	Weight approx. kg
<b>Speed 1000 min<sup>-1</sup></b>												
E.GV–090LX–06	0.65	890	1.84	66	0.79	HS 3	1.7	1.8	3.3	30	0.0036	22
E.GV–090LB–06*	0.95	900	2.7	68	0.77	HS 4	1.8	2.0	3.7	20	0.0036	22
E.GV–100LB–06	1.3	955	3.8	76	0.70	HS 4	2.4	2.7	4.8	24	0.0086	35
E.GV–112MB–06	1.9	945	4.6	80.3	0.75	HS 4	1.8	2.0	4.4	30	0.014	38
E.GV–132SB–06	2.6	965	5.7	84.5	0.81	HS 5	2.5	2.5	6.2	30	0.030	59
E.GV–132MB–06	3.5	955	7.6	84.7	0.81	HS 4	2.5	2.6	5.8	23	0.033	67
E.GV–132MD–06	4.8	955	10.4	86	0.80	HS 5	2.5	2.8	6.3	17	0.045	72
E.GV–160MB–06	6.6	965	13.9	87.2	0.81	HS 5	2.5	2.8	6.7	12	0.100	108
E.GV–160LB–06	9.7	970	19.8	88.6	0.82	HS 5	2.4	3.0	7.5	9	0.134	130
E.GV–180LB–06	13.2	970	28	89.8	0.77	HS 4	2.1	2.9	5.8	16	0.13	176
E.GV–200LG–06	16.5	980	33	91.1	0.83	HS 4	2.2	2.8	6.5	17	0.33	262
E.GV–200LJ–06	20	980	40.5	91.5	0.80	HS 5	2.4	2.8	6.7	11	0.33	282
E.GV–225MB–06	27	990	54	93	0.79	SHS	1.8	2.8	7.5	15	0.55	315
E.GV–250MB–06	33	985	64	92.7	0.83	SHS	1.7	2.6	6.2	10	1.1	420
E.GV–280SG–06	40	985	74	93	0.86	DS 4	2.2	2.2	6.0	10	2.3	605
E.GV–280MG–06	46	985	85	93.3	0.88	DS 4	2.2	2.5	6.4	9	2.9	715
E.GV–315SB–06	64	990	120	95.5	0.88	HS 2	1.2	2.3	5.9	18	2.7	795
E.GV–315MB–06	76	991	140	95.3	0.86	HS 2	1.2	2.3	5.8	24	3.2	890
E.GV–315MC–06	85	992	156	95.6	0.86	HS 2	1.3	2.3	5.8	13	3.8	960
E.GV–315MD–06	105	991	195	95.5	0.86	HS 2	1.3	2.3	6.0	10	3.8	960
E.GV–315LB–06	130	990	235	95.8	0.87	HS 2	1.3	2.3	6.2	9	4.7	1165
E.GV–355MB–06	170	993	310	96.1	0.87	HS 2	1.0	2.2	5.7	11	7.8	1740
E.GV–355LB–06	200	993	360	96.2	0.87	HS 2	1.0	2.2	6.0	10	9.1	1940

Higher outputs, other voltages and frequencies on request.

For motors still uncertified by the PTB modifications are possible.

\* Utilization to insulation class F.



## Series ENGV / EMGV, Output tables

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Increased Safety” EEx e II**

**440V – 60 Hz**  
Class F insulation, Utilization to B  
**Temperature class T3**

**Types: ENGV / EMGV    Number of poles: 2 – 60 Hz**

Type	Rated output	Rated speed	Rated current at 440V	Efficiency	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque rated torque	Starting current rated current	Time of temperature rise $t_E$ T3	Moment of inertia $J_M$	Weight
	kW	min <sup>-1</sup>	A	%	cosφ		$M_A/M_N$	$M_K/M_N$	$I_A/I_N$	sec.	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 3600 min<sup>-1</sup></b>												
E.GV-090LX-02	1.3	3430	2.6	80.0	0.86	HS 5	3.0	3.0	7.0	11	0.0020	22
E.GV-090LB-02	1.85	3420	3.5	82.0	0.86	HS 5	3.0	3.0	7.8	8	0.0020	22
E.GV-100LB-02	2.5	3445	4.4	83.5	0.90	HS 4	2.1	2.4	7.2	11	0.0039	35
E.GV-112MD-02	3.3	3455	5.4	86.0	0.94	HS 4	2.3	3.0	7.5	15	0.0075	38
E.GV-132SD-02	4.6	3490	7.7	87.9	0.90	HS 5	2.5	3.0	7.4	10	0.0140	56
E.GV-132SX-02	5.5	3490	9.3	88.6	0.88	HS 5	2.7	3.0	7.6	9	0.0150	60
E.GV-160MB-02	7.5	3525	12.4	90.1	0.88	HS 5	2.8	3.0	7.3	13	0.0364	104
E.GV-160MD-02	10	3230	16.5	91.1	0.89	HS 4	1.9	2.6	6.7	17	0.045	106
E.GV-160LB-02	12.5	3530	20.5	91.9	0.88	HS 4	2.1	2.8	6.9	14	0.057	130
E.GV-180MB-02	15	3535	25.0	89.0	0.88	HS 4	1.8	2.3	6.6	15	0.094	162
E.GV-200LG-02	20	3555	34.0	91.0	0.86	HS 3	1.6	3.0	7.3	16	0.182	252
E.GV-200LJ-02	24	3550	39.5	92.9	0.87	HS 3	1.3	2.6	6.9	19	0.200	262
E.GV-225MB-02	28	3560	45	93.1	0.90	HS 4	2.0	2.4	7.2	10	0.247	305
E.GV-250MB-02	36	3560	56	94.0	0.91	HS 2	1.2	2.4	6.4	15	0.45	410
E.GV-280SG-02	47	3575	73	92.9	0.91	HS 2	1.5	2.5	7.4	13	0.88	555
E.GV-280MG-02	58	3575	90	94.6	0.92	HS 2	1.3	2.2	7.1	12	1.03	590
E.GV-315SA-02 <sup>1</sup>	68	3580	105	94.8	0.90	HS 2	1.1	2.4	6.7	25	1.61	735
E.GV-315SB-02 <sup>1</sup>	80	3580	125	94.8	0.90	HS 2	1.1	2.3	6.7	25	1.61	735
E.GV-315MB-02 <sup>1</sup>	100	3585	155	95.6	0.90	HS 2	1.1	2.3	7.1	21	1.91	835
E.GV-315MD-02 <sup>1</sup>	130	3580	195	95.9	0.93	HS 2	0.8	1.8	6.0	17	2.30	905
E.GV-315LB-02 <sup>1</sup>	150	3580	225	96.0	0.92	HS 2	1.0	2.2	6.5	14	2.80	1085
E.GV-355MB-02	185	3580	280	96.0	0.91	HS 2	0.9	2.2	6.6	14	2.60	1570
E.GV-355LB-02	220	3580	330	96.1	0.92	HS 2	1.1	2.3	6.0	14	3.16	1820

Higher outputs, other voltages and frequencies on request.

For motors still uncertified by the PTB modifications are possible.

<sup>1</sup> Type E.GV-315

We reserve us the right to deliver foot-mounted types (E.SV) in welded design.

(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

Type series E and A..K

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
 Protection type "Increased Safety" EEx e II

**440V – 60 Hz**  
 Class F insulation, Utilization to B  
 Temperature class T3

**Types: ENGV / EMGV    Number of poles: 4    – 60 Hz**

Type	Rated output	Rated speed	Rated current at	Efficiency	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque with direct-on starting as a multiple of the rated torque	Starting current with direct-on starting as a multiple of the rated current	Time of temperature rise $t_E$ T3	Moment of inertia $J_M$	Weight
	kW	min <sup>-1</sup>	440V A	%	cos $\varphi$		$M_A/M_N$	$M_K/M_N$	$I_A/I_N$	sec.	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 1800 min<sup>-1</sup></b>												
E.GV-090LX-04	1.0	1690	2.1	75.2	0.83	HS 5	2.5	2.6	5.6	13	0.0036	22
E.GV-090LB-04	1.35	1705	3.0	78.0	0.79	HS 5	2.6	2.9	6.3	10	0.0036	22
E.GV-100LB-04	2.0	1690	4.0	80.0	0.82	HS 5	2.3	2.6	5.8	14	0.0051	35
E.GV-100LD-04	2.5	1690	5.0	81.0	0.83	HS 5	2.5	2.5	6.1	12	0.0066	38
E.GV-112MB-04	3.6	1705	6.9	84.3	0.82	HS 4	2.4	2.6	6.8	12	0.012	41
E.GV-132SB-04	5.0	1730	8.9	87.2	0.85	HS 5	2.4	2.5	7.5	13	0.022	59
E.GV-132MB-04	6.8	1725	12.0	88.0	0.86	HS 5	2.5	2.5	7.3	11	0.030	69
E.GV-160MB-04	10	1735	17.8	90.4	0.83	HS 4	2.1	2.9	7.8	12	0.068	108
E.GV-160LB-04	13.5	1750	23.7	91.2	0.84	HS 4	2.2	3.0	7.6	11	0.092	130
E.GV-180MB-04	15	1750	25.5	91.4	0.85	HS 4	2.1	2.8	7.1	13	0.13	162
E.GV-180LB-04	17.5	1755	29.0	91.8	0.88	HS 4	2.1	3.0	7.3	11	0.16	176
E.GV-200LG-04	24	1765	41	92.7	0.83	HS 4	2.0	3.1	7.9	14	0.25	254
E.GV-225SB-04	30	1770	51	93.5	0.84	HS 4	2.2	2.8	7.1	9	0.37	305
E.GV-225MB-04	36	1775	61	93.7	0.83	HS 4	2.1	2.7	7.4	9	0.44	335
E.GV-250MB-04	44	1785	72	94.8	0.85	SHS	1.4	2.5	7.3	16	0.80	425
E.GV-280SG-04	58	1785	98	94.8	0.82	HS 3	1.8	2.3	7.6	11	1.43	575
E.GV-280MG-04	70	1780	105	94.9	0.94	SHS	1.4	2.7	7.5	14	1.65	650
E.GV-315SB-04	90	1785	145	95.8	0.86	HS 2	1.0	2.4	6.5	13	2.34	795
E.GV-315MB-04	100	1785	162	95.8	0.85	HS 2	1.0	2.3	6.4	12	2.8	890
E.GV-315MD-04	125	1788	205	95.8	0.84	HS 2	1.1	2.3	6.2	13	3.3	960
E.GV-315LB-04	140	1788	225	96.1	0.86	HS 2	1.2	2.3	7.1	11	3.9	1165
E.GV-355MB-04	185	1788	303	96.1	0.84	HS 2	1.0	2.3	6.0	12	5.5	1650
E.GV-355LB-04	220	1788	356	96.3	0.84	HS 2	0.9	2.3	6.9	9	6.8	1885

Higher outputs, other voltages and frequencies on request.  
 For motors still uncertified by the PTB modifications are possible.

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
 Protection type "Increased Safety" EEx e II

**440V – 60 Hz**  
 Class F insulation, Utilization to B  
 Temperature class T3

**Types: ENGV / EMGV      Number of poles: 6 – 60 Hz**

Type	Rated output	Rated speed	Rated current at 440V	Efficiency	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque rated torque	Starting current rated current	Time of temperature rise $t_E$ T3	Moment of inertia $J_M$	Weight
	kW	min <sup>-1</sup>	A	%	cosφ		$M_A/M_N$	$M_K/M_N$	$I_A/I_N$	sec.	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 1200 min<sup>-1</sup></b>												
E.GV-090LX-06	0.65	1065	1.65	66	0.79	HS 3	1.7	1.8	3.4	35	0.0036	22
E.GV-090LB-06*	0.95	1080	2.50	68	0.77	HS 4	1.8	2.0	3.8	21	0.0036	22
E.GV-100LB-06	1.3	1145	3.40	76	0.70	HS 4	2.4	2.5	5.0	26	0.0086	35
E.GV-112MB-06	1.9	1130	4.1	80.3	0.75	HS 4	1.8	2.0	4.6	30	0.014	38
E.GV-132SB-06	2.6	1155	5.1	84.5	0.81	HS 5	2.5	2.4	6.4	30	0.030	59
E.GV-132MB-06	3.5	1140	6.8	84.7	0.81	HS 4	2.5	2.5	5.9	24	0.033	67
E.GV-132MD-06	4.8	1140	9.3	86	0.80	HS 5	2.5	2.6	6.5	17	0.045	72
E.GV-160MB-06	6.6	1155	12.5	87.2	0.81	HS 5	2.5	2.6	6.9	13	0.100	108
E.GV-160LB-06	9.7	1160	17.8	88.6	0.82	HS 5	2.4	2.8	7.6	9	0.134	130
E.GV-180LB-06	13.2	1160	25.5	89.8	0.77	HS 4	2.1	2.7	6.0	17	0.13	176
E.GV-200LG-06	16.5	1175	29	91.1	0.83	HS 4	2.2	2.6	6.7	18	0.33	262
E.GV-200LJ-06	20	1175	36	91.5	0.80	HS 5	2.4	2.6	7.0	13	0.33	282
E.GV-225MB-06	27	1185	49	93	0.79	SHS	1.8	2.6	7.7	16	0.55	315
E.GV-250MB-06	33	1185	57	92.7	0.83	SHS	1.7	2.5	6.4	10	1.1	420
E.GV-280SG-06	40	1185	66	93	0.86	DS 4	2.2	2.2	6.2	14	2.3	605
E.GV-280MG-06	46	1185	75	93.3	0.88	DS 4	2.2	2.3	6.6	9	2.9	715
E.GV-315SB-06	64	1185	102	95.5	0.88	HS 2	1.2	2.2	6.3	23	2.7	795
E.GV-315MB-06	76	1185	123	95.3	0.86	HS 2	1.2	2.2	6.0	27	3.2	890
E.GV-315MC-06	85	1185	137	95.6	0.86	HS 2	1.3	2.2	6.1	17	3.8	960
E.GV-315MD-06	105	1185	170	95.5	0.86	HS 2	1.3	2.2	6.3	10	3.8	960
E.GV-315LB-06	130	1187	207	95.8	0.87	HS 2	1.3	2.2	6.5	10	4.7	1165
E.GV-355MB-06	170	1190	270	96.1	0.87	HS 2	1.0	2.2	6.0	10	7.8	1740
E.GV-355LB-06	200	1190	310	96.2	0.87	HS 2	1.0	2.2	6.3	9	9.1	1940

Higher outputs, other voltages and frequencies on request.  
 For motors still uncertified by the PTB modifications are possible.  
 \* Utilization to insulation class F.

**Pole-changing three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
 Protection type "Increased Safety" EEx e II

**400V – 50 Hz**  
 Class F insulation, Utilization to B  
 Temperature class T3

**Types: ENGV / EMGV      Number of poles: 4 / 2**

Type	Rated output	Rated speed	Rated current at 400V	Efficiency	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque starting as a multiple of the rated current	Time of temperature rise $t_E$ T1, T2–T3	Moment of inertia $J_M$ approx. kgm <sup>2</sup>	Weight approx. kg
	kW	min <sup>-1</sup>	A	%	cos φ		$M_A/M_N$	$I_A/I_N$	sec.		

**Pole-changing for 2 speeds with 1 Dahlander-connected winding**

**Speed 1500/3000 min<sup>-1</sup>**

E.GV–112MB–42	2.8/3.5	1420/2890	5.8/7.0	82/80	0.87/0.92	HS 4	1.8/1.8	5.8/6.6	15/10–15/10	0.012	41
E.GV–132SB–42	4.0/5.2	1450/2895	7.8/9.7	86/83	0.86/0.95	HS 4	2.2/2.0	6.5/6.8	13/9–13/9	0.022	59
E.GV–132MB–42	5.0/6.3	1445/2905	9.5/11.5	87/85	0.86/0.93	HS 4	2.0/2.0	6.5/7.5	12/8–12/8	0.030	69
E.GV–160MB–42	7.5/9.0	1460/2930	15/17	89/85	0.82/0.91	HS 5	2.3/2.6	6.1/7.5	18/12–15/6	0.068	108
E.GV–160LB–42	10/12	1450/2930	19.5/21	89/90	0.83/0.92	HS 4	2.1/2.3	5.3/7.4	20/11–9/5	0.092	130
E.GV–180MB–42	12/14.5	1470/2945	22.5/26.6	89.5/87	0.87/0.92	HS 4	2.2/2.1	6.3/7.2	24/15–12/7	0.13	162
E.GV–180LB–42	14/16	1450/2930	25/29	90/87	0.90/0.92	HS 3	1.5/1.8	5.5/7.0	28/16–22/9	0.16	176
E.GV–200LG–42	17/20	1470/2995	31/36	90/87	0.87/0.94	DS 4	2.3/2.4	5.8/7.5	35/19–25/12	0.25	254
E.GV–225SB–42	21/24	1470/2960	38/40	92/90	0.87/0.93	DS 4	2.3/2.4	5.7/7.5	30/20–10/7	0.34	305
E.GV–225MB–42	25/30	1475/2965	47/55	92/89	0.85/0.92	DS 4	2.3/2.4	6.2/7.9	30/20–13/7	0.41	335
E.GV–250MB–42	32/40	1475/2960	59/68	93/92	0.84/0.92	HS 2	1.2/1.3	4.4/5.8	60/35–28/16	0.88	425
E.GV–280SG–42	44/55	1485/2970	82/94	94/93	0.83/0.93	HS 2	1.3/1.3	5.0/6.4	55/30–21/11	1.43	575
E.GV–280MG–42	52/65	1485/2975	96/109	94.2/93	0.83/0.93	HS 2	1.3/1.3	5.2/6.9	50/20–22/8	1.66	650
E.GV–315SB–42 <sup>1</sup>	60/70	1485/2980	109/114	95/94	0.84/0.94	HS 2	1.2/1.1	5.2/6.7	35/29–17/13	2.4	795
E.GV–315MB–42 <sup>1</sup>	80/95	1490/2985	145/154	95/94	0.85/0.94	HS 2	1.1/1.0	5.8/7.1	30/22–12/8	2.8	890
E.GV–315MD–42 <sup>1</sup>	90/105	1490/2985	163/170	95/94	0.85/0.94	HS 2	1.1/1.0	6.0/7.2	24/21–9/7	3.3	960
E.GV–315LB–42 <sup>1</sup>	100/120	1490/2985	180/195	95.5/94.5	0.85/0.94	HS 2	1.0/1.0	6.0/7.4	24/21–9/8	4.0	165

If only one time of temperature rise  $t_E$  is indicated, it applies to both pole numbers.

Higher outputs, other voltages and frequencies on request.

For motors still uncertified by the PTB modifications are possible.

<sup>1</sup> Type E.SV-315

We reserve us the right to deliver foot-mounted types (E.SV) in welded design.

(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

**Pole-changing three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
 Protection type "Increased Safety" EEx e II  
 Types: ENGV / EMGV      Number of poles: 8 / 4

**400V – 50 Hz**  
 Class F insulation, Utilization to B  
 Temperature class T3

Type	Rated output	Rated speed	Rated current at	Efficiency	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque with direct-on starting as a multiple of the rated current	Time of temperature rise t <sub>E</sub>			Moment of inertia J <sub>M</sub>	Weight
	kW	min <sup>-1</sup>	400V A	%	cos φ		M <sub>A</sub> /M <sub>N</sub>	I <sub>A</sub> /I <sub>N</sub>	T1	T2	T3	ap- prox. kgm <sup>2</sup>	ap- prox. kg
									sec.				
Pole-changing for 2 speeds with 1 Dahlander-connected winding										Speed 750/1500 min <sup>-1</sup>			
E.GV-112MB-84	1.25/2	710/1425	3.75/4.7	70/70	0.69/0.88	HS 3	2.0/1.7	3.8/4.8	30/15	30/15	30/14	0.014	41
E.GV-132SB-84	2/3.2	715/1450	5.4/6.8	78/79	0.70/0.88	HS 3	1.6/1.5	4.1/5.5	35/16	35/16	35/15	0.033	59
E.GV-132MB-84	2.8/4.5	725/1455	7.7/9.6	81/79	0.65/0.86	HS 5/4	2.5/2.3	4.8/6.5	35/17	35/17	35/16	0.045	72
E.GV-160MB-84	3.6/5.3	725/1450	8.5/11.0	82/80	0.74/0.88	HS 4	2.0/2.0	5.2/6.0	28/15	28/15	28/15	0.092	104
E.GV-160MD-84	5/7.5	720/1445	12.0/16.0	83/79	0.74/0.89	HS 4	2.2/2.2	5.5/6.1	20/10	20/10	20/10	0.116	108
E.GV-160LB-84	7/10.5	725/1445	16.0/22.0	85.5/80.5	0.76/0.88	HS 4	2.1/2.2	5.6/6.4	25/10	25/10	25/10	0.158	130
E.GV-180LB-84	10/14.5	725/1455	22.5/26.5	86/86	0.74/0.91	HS 4	2.4/2.2	6.3/8.0	24/10	24/10	23/9	0.19	176
E.GV-200LG-84	13/20	730/1465	31/37.5	87.5/86.5	0.71/0.89	DS 4	2.7/2.5	5.5/7.0	40/21	40/21	21/11	0.33	258
E.GV-225SB-84	16/24	735/1470	35/42	88.5/88.5	0.77/0.93	HS 3	1.5/1.6	4.5/5.6	50/29	50/29	35/15	0.46	305
E.GV-225MB-84	19/29	735/1470	41.5/50	89/90	0.75/0.93	HS 3	1.6/1.6	4.7/6.0	50/25	50/25	28/11	0.55	325
E.GV-250MB-84	23/35	735/1470	47/60	91.5/91	0.78/0.92	HS 3	1.5/1.8	5.0/6.2	50/30	50/30	27/13	1.0	415
E.GV-280SG-84	30/47	740/1480	63/82	92/92.3	0.75/0.91	DS 4	1.5/1.5	4.7/5.9	30	30	26/10	1.7	585
E.GV-280MG-84	35/55	740/1480	73/94	92.5/93	0.76/0.91	DS 4	1.6/1.6	5.2/6.3	24	24	24/7	2.1	640
E.GV-315SB-84	45/68	740/1490	105/118	92.5/92.5	0.68/0.91	HS 2	1.1/1.2	4.5/6.5	50/30	50/30	30/13	2.7	780
E.GV-315MB-84	55/75	745/1490	122/130	93/93	0.70/0.92	HS 2	1.1/1.2	4.5/7.1	50/30	50/30	25/14	3.2	875
E.GV-315MD-84	62/83	740/1490	135/142	94/94.5	0.72/0.91	HS 2	1.0/1.2	4.6/7.2	50/30	50/30	27/11	3.7	940
E.GV-315LB-84	72/100	743/1490	155/170	94.5/94.8	0.72/0.91	HS 2	1.0/1.2	4.6/7.4	60/30	60/30	35/12	4.7	1145

If only one time of temperature rise t<sub>E</sub> is indicated, it applies to both pole numbers.  
 Higher outputs, other voltages and frequencies on request.  
 For motors still uncertified by the PTB modifications are possible.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

**Protection type “Increased safety” EEx e II****Types: ENGV / EMGV****Number of poles: 6 / 4****400V – 50 Hz****Class F insulation, Utilization to B****Temperature class T3****Types: ENGV / EMGV****Number of poles: 8 / 6**

Type	Rated output	Rated speed	Rated current at	Efficiency	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque rated current	Time of temperature rise $t_E$			Moment of inertia $J_M$	Weight
									T1	T2	T3		
			400V										
	kW	min <sup>-1</sup>	A	%	cosφ		$M_A/M_N$	$I_A/I_N$	sec.			ap-prox. kgm <sup>2</sup>	ap-prox. kg

**Pole-changing for 2 speeds with 2 separate windings****Speed 1000/1500 min<sup>-1</sup>**

E.GV-112MB-64	1.5/2.2	960/1450	3.9/4.6	77/81	0.73/0.85	HS 3	2.0/1.8	5.5/6.0	14/8	14/8	13/8	0.011	40
E.GV-132SB-64	1.8/2.5	960/1450	4.5/5.2	79/82	0.75/0.86	HS 3	2.0/1.8	5.6/6.7	15/15	15/15	15/15	0.0236	59
E.GV-132MB-64	2.8/4.2	960/1450	7.4/8.7	79/85	0.71/0.83	HS 4	2.1/2.0	5.0/6.1	8/8	8/8	8/8	0.030	69
E.GV-160MB-64	4/5.5	965/1465	8.2/10.7	83/84.5	0.84/0.88	HS 4	2.2/2.0	6.9/7.7	15/15	15/15	6/6	0.068	108
E.GV-160LB-64	5/7.5	970/1465	10.5/14	85.5/87	0.81/0.90	HS 4	2.3/1.7	7.5/7.8	12/10	12/10	12/10	0.092	130
E.GV-180LB-64	7.5/11	970/1470	15/20.5	86/88	0.84/0.90	HS 3	1.8/1.6	6.7/7.7	12/12	12/12	12/12	0.13	176
E.GV-200LG-64	10/15	975/1465	20.5/27	87/89	0.82/0.91	DS 5	3.0/2.3	7.1/7.0	9/9	9/9	9/9	0.247	254
E.GV-200LJ-64	12/17	975/1470	26/32	87/89	0.80/0.89	DS 5	2.7/2.3	7.2/7.8	7/8	7/8	7/6	0.247	254
E.GV-225MB-64	15/22	985/1485	33/41.5	89.5/89.5	0.75/0.86	DS 4	2.4/2.1	5.4/6.2	22/21	22/21	20/18	0.4	335
E.GV-250MB-64	23/32	990/1490	45/58	92/92.5	0.81/0.87	HS 3	1.5/1.3	6.1/7.6	22/21	22/21	22/18	0.79	425
E.GV-280SG-64	27/40	990/1485	49/68	92/92.5	0.88/0.91	HS 4/3	2.0/1.4	6.2/6.0	29	29	28/20	1.73	575
E.GV-280MG-64	32/48	990/1485	57/81	92.3/93	0.88/0.93	HS 4/3	2.0/1.6	6.5/6.4	24	24	19	2.1	650
E.GV-315SB-64	46/62	990/1490	85/104	93.5/94	0.84/0.92	HS 2	1.3/1.1	7.3/7.2	29/24	29/24	29/24	2.7	795
E.GV-315MB-64	55/75	990/1490	102/130	93.5/94	0.84/0.92	HS 2	1.3/1.1	7.1/6.6	28/27	28/27	18/21	3.2	890
E.GV-315MD-64	63/85	990/1490	116/143	93.5/94	0.84/0.92	HS 2	1.2/1.0	7.0/7.0	>10	>10	>10	3.7	960
E.GV-315LB-64	75/100	990/1490	140/170	93.7/94	0.84/0.92	HS 2	1.0/1.0	7.0/7.0	>10	>10	>10	4.4	1165

**Pole-changing for 2 speeds with 2 separate windings****Speed 750/1000 min<sup>-1</sup>**

E.GV-112MB-86	0.75/1.3	720/970	2.4/3.6	70/75	0.67/0.69	HS 3	1.8/1.9	3.8/4.9	20/11	20/11	20/11	0.0136	41
E.GV-132SB-86	1.2/1.6	720/975	3.6/4.4	73/75.5	0.68/0.70	HS 3	1.6/1.5	4.9/5.6	24/12	24/12	24/12	0.033	59
E.GV-132MB-86	1.5/2.4	720/975	4.6/7.0	73/77	0.64/0.64	HS 5	2.5/2.7	4.2/6.0	24/10	24/10	22/10	0.045	72
E.GV-160MB-86	3/4	720/970	6.4/8.2	82.5/85.3	0.80/0.82	HS 4	2.0/1.8	5.4/6.7	30/19	30/19	30/19	0.094	108
E.GV-160LB-86	4.5/6	720/970	10.0/12.6	84/86	0.78/0.80	HS 4	2.2/1.9	5.7/6.6	25/14	25/14	24/13	0.127	130
E.GV-180LB-86	5.5/7.5	730/985	13.2/17.2	83.5/86.9	0.72/0.72	HS 3	1.4/1.3	4.8/5.9	25/18	25/18	25/18	0.13	176
E.GV-200LG-86	7.5/10	725/980	16.0/19.5	85.5/86.5	0.80/0.82	DS 4	2.2/2.3	5.3/7.0	30/26	30/26	30/26	0.33	262
E.GV-225SB-86	10/14	730/985	22/29	86/87	0.77/0.80	DS 5	2.7/2.6	5.4/6.8	13/10	13/10	13/10	0.46	305
E.GV-225MB-86	15/20	725/980	31/39	87/90	0.80/0.83	DS 4	2.5/2.3	5.4/6.4	18/12	18/12	18/12	0.51	315
E.GV-250MB-86	17/25	730/980	32/45	89/91	0.84/0.87	HS 3	1.6/1.5	4.0/4.0	22/17	22/17	22/17	1.0	420
E.GV-280SG-86	23/30	735/985	48/56	90.5/91.5	0.78/0.85	DS 4	2.1/1.8	5.8/5.6	45/35	45/35	30/30	1.73	605
E.GV-280MG-86	28/37	740/990	57/68	92.0/92.8	0.78/0.85	DS 4	2.1/1.8	5.7/6.0	40/30	40/30	27/20	2.1	670
E.GV-315SB-86	34/45	740/990	65/82	92/93	0.82/0.86	HS 2	1.4/1.0	6.0/5.8	40/50	40/50	30/30	3.4	795
E.GV-315MB-86	41/55	740/990	79/100	93/93.5	0.82/0.85	HS 2	1.3/1.0	5.3/5.7	50/40	50/40	29/27	4.0	890
E.GV-315MD-86	49/65	740/990	96/120	93/93.5	0.82/0.85	HS 2	1.2/1.0	6.0/6.5	25/20	25/20	14/10	4.7	960
E.GV-315LB-86	56/75	740/990	110/137	93.5/94	0.82/0.85	HS 2	1.2/1.0	6.0/6.5	23/18	23/18	12/10	5.8	1165

If only one time of temperature rise  $t_E$  is indicated, it applies to both pole numbers.

Higher outputs, other voltages and frequencies on request.

For motors still uncertified by the PTB modifications are possible.

**Pole-changing three-phase motors with squirrel cage**

Totally enclosed fan-cooled, enclosure IP 55

Protection type "Increased safety" EEx e II

400V – 50 Hz

Class F insulation, Utilization to B

Temperature class T3

Types: EVGV

Number of poles: 8 / 4

Fan design

Types: EVGV

Number of poles: 6 / 4

Fan design

Type	Rated output	Rated speed	Rated current at	Efficiency	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque with starting as a multiple of the rated current	Time of temperature rise $t_E$			Moment of inertia $J_M$	Weight
	kW	min <sup>-1</sup>	400V A	%	cosφ		$M_A/M_N$	$I_A/I_N$	T1	T2	T3	ap- prox. kgm <sup>2</sup>	ap- prox. kg
									sec.				

**Pole-changing for 2 speeds with 1 Dahlander-connected winding****Speed 750/1500 min<sup>-1</sup>**

EVGV-112MB-84	0.46/2.2	715/1420	1.29/5.2	73/70	0.73/0.88	HS 3	1.8/1.6	3.8/4.6	90/16	90/16	80/14	0.014	41
EVGV-132SB-84	1/4	720/1455	3.2/8.2	78/85	0.59/0.84	HS 4	1.9/2.0	4.0/7.7	50/10	50/10	50/10	0.022	59
EVGV-132MB-84	1.25/5	725/1465	3.8/10.0	78/85	0.63/0.85	HS 4	1.9/2.3	4.8/8.9	60/7	60/7	60/7	0.030	69
EVGV-160MD-84	1.65/7.5	725/1445	3.8/16.0	83/79	0.77/0.89	HS 4	1.7/2.2	5.3/6.1	60/10	60/10	60/10	0.12	108
EVGV-160LB-84	2.4/10.5	725/1445	5.3/21.5	83/80	0.79/0.88	HS 4	1.6/2.2	4.6/6.4	15/10	15/10	15/9	0.158	130
EVGV-180LB-84	3.3/14.5	730/1455	7.0/27	86/86	0.78/0.91	HS 4	2.0/2.5	6.7/8.0	24/10	24/10	23/9	0.19	176
EVGV-200LG-84	4.3/20	730/1465	9.3/38	87/87	0.78/0.89	DS 4	2.4/2.5	5.5/7.0	40/21	40/21	21/11	0.33	254
EVGV-225SB-84	6.0/24	735/1470	13/42	88/88	0.79/0.93	HS 3	1.2/1.8	3.9/5.6	60/29	60/29	60/15	0.46	305
EVGV-225MB-84	6.3/29	735/1470	13/50	89/90	0.80/0.93	HS 3	1.6/1.6	4.5/6.0	80/25	80/25	80/11	0.55	335
EVGV-250MB-84	7.6/35	735/1470	15/61	91/91	0.82/0.91	HS 3	1.2/1.7	4.4/5.6	50/27	50/27	22/12	1.0	425
EVGV-280SG-84	10/47	740/1480	22/82	91/92	0.72/0.91	DS 4	1.3/1.6	3.6/5.9	60/30	60/30	26/10	1.7	575
EVGV-280MG-84	12/55	740/1480	25/94	92/92.8	0.73/0.91	DS 4	1.3/1.7	4.0/6.9	100/26	100/26	80/9	2.2	650
EVGV-315SB-84	15/68	740/1490	33.5/120	92/92.5	0.70/0.91	HS 2	1.1/1.2	4.3/6.5	50/30	50/30	45/13	2.7	795
EVGV-315MB-84	18/75	745/1490	39/130	93/93	0.70/0.92	HS 2	1.0/1.2	4.5/7.1	50/30	50/30	25/14	3.2	890
EVGV-315MD-84	20/85	745/1490	43/145	93.5/94.5	0.72/0.91	HS 2	1.0/1.2	4.5/7.2	50/30	50/30	25/11	4	960
EVGV-315LB-84	24/100	745/1490	51/170	94/94.8	0.73/0.91	HS 2	1.0/1.2	4.1/7.1	80/30	80/30	80/17	4.7	1165

**Pole-changing for 2 speeds with 2 separate windings****Speed 1000/1500 min<sup>-1</sup>**

EVGV-112MB-64	0.75/2.2	960/1450	2.0/4.6	77/80	0.73/0.85	HS 4	1.8/2.1	5.4/6.0	28/8	28/8	28/8	0.011	40
EVGV-132SB-64	0.8/2.5	975/1470	2.2/5.5	82/82	0.73/0.82	HS 4	2.0/1.8	4.3/6.4	30/14	30/14	30/14	0.0236	59
EVGV-132MB-64	1.4/4.2	960/1450	3.5/8.6	80/86	0.75/0.82	HS 4	1.7/1.9	4.0/6.5	28/10	28/10	28/10	0.030	69
EVGV-160MB-64	1.8/5.5	970/1465	3.7/10.6	81/85	0.86/0.88	HS 3	1.5/1.7	6.3/7.7	35/15	35/15	35/15	0.068	108
EVGV-160LB-64	2.5/7.5	970/1465	5.2/14.0	85/86	0.81/0.90	HS 4	2.0/1.7	7.5/7.8	25/10	25/10	25/10	0.092	130
EVGV-180LB-64	3.7/11	970/1470	7.4/20.5	87/87	0.84/0.90	HS 3	1.8/1.5	6.7/7.7	24/13	24/13	24/13	0.13	176
EVGV-200LG-64	5/15	975/1465	10.3/27.0	85/88	0.83/0.91	DS 5	3.0/2.4	6.9/7.0	23/11	23/11	23/11	0.247	254
EVGV-200LJ-64	6/17	975/1470	13/32	86/88	0.81/0.89	DS 5	2.7/2.3	6.6/7.4	11/7	11/7	11/7	0.247	254
EVGV-225MB-64	8/24	985/1485	17/45	89/91	0.79/0.85	DS 4	2.4/2.1	5.4/6.7	40/18	40/18	40/18	0.40	335
EVGV-250MB-64	12/35	990/1485	23/62	90/92	0.84/0.88	HS 3	1.4/1.3	5.9/6.4	23/27	23/27	23/20	0.79	425
EVGV-280SG-64	15/46	990/1485	28.5/80	89.5/93	0.88/0.92	HS 4	2.0/1.8	6.2/6.5	16/30	16/30	16/30	1.73	575
EVGV-280MG-64	18/55	990/1485	32.5/93	90/93.5	0.88/0.92	HS 4	2.0/1.8	6.0/6.3	30/40	30/40	30/16	2.1	650
EVGV-315SB-64	23/70	990/1490	43/120	92/93.5	0.86/0.91	HS 3	1.2/1.2	6.6/6.6	20	20	18	2.70	795
EVGV-315MB-64	27/85	990/1485	51/147	93.5/94.5	0.85/0.91	HS 2	1.2/1.1	6.2/6.4	40/23	40/23	40/19	3.2	890
EVGV-315MD-64	31/95	990/1490	58/168	92.5/93.6	0.88/0.92	HS 2	1.1/1.0	5.8/6.8	35/22	35/22	24/10	3.7	960
EVGV-315LB-64	35/110	990/1490	62/185	94/95	0.88/0.92	HS 2	1.1/1.1	5.7/7.2	50/18	50/18	45/14	4.4	1165

If only one time of temperature rise  $t_E$  is indicated, it applies to both pole numbers.

Higher outputs, other voltages and frequencies on request.

For motors still uncertified by the PTB modifications are possible.

**Dimension drawings for motors and terminal box**

**See**  
**Series A... Dimension drawings**  
**Page 86**

For the mounting types IM B3, IM B5 and IM B35 with terminal box on top the single dimension drawings are available in the output tables of the CD version (not in the printed version of this technical list).

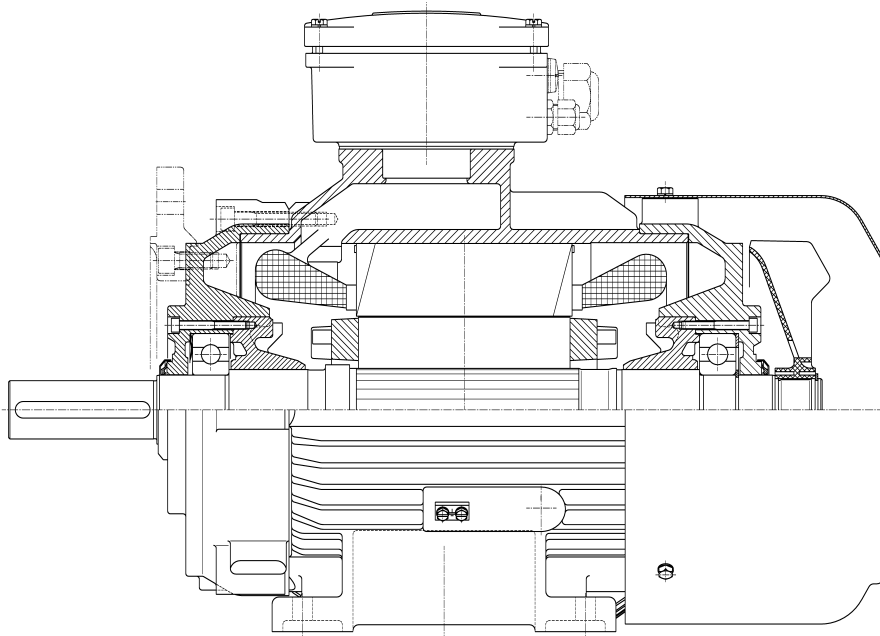


# Series DN . . , Flameproof enclosure “d”

Technical description  
Sectional view  
Frame, cooling system  
Protection against condensation water

## Sectional view

Three-phase motor Type DNGW-160 ML-04



## Stator frame, ventilation

Frame size	Material	Frame Frame feet <sup>1</sup>	Surface	End shields Material	Flange disk on the end shield	Fan cowl Material	Material	Fan suitable for									
071	Cast iron	cast-on	with cooling fins	Cast iron	screwed-on	Sheet steel	Plastic <sup>2</sup> (= non-sparking)	bi-directional									
080					cast-on												
090																	
100		screwed-on			screwed-on <sup>4</sup>												
112																	
132		cast-on															
160		screwed-on															
180																	
200																	
225																	
250	welded steel	welded-on			cast-on		welded steel <sup>3</sup>										
280																	
315																	

<sup>1</sup> For foot-mounting types only.

<sup>2</sup> For special operating conditions we can also supply for the the frame sizes 071–180 external fans made of aluminium, for the frame sizes 200–315 of steel. This applies especially to high coolant temperatures.

<sup>3</sup> Frame size 315 2-pole: Plastic

<sup>4</sup> For frame size 132 in special design.

The cooling-air flow from NDE to DE must not be hindered.  
The intake area of the fan cowl must be kept clear.

## Protection against condensation water

From frame size 250 onwards flameproof motors are provided with separate areas inside the flameproof enclosure at the driving and non-driving ends for the collection of any condensed water which may occur. Damage to the winding

due to the accumulation of water inside the winding-head areas is thus avoided. For smaller motors (frame sizes 071 to 225) the danger of adverse effects from condensed water is counteracted by the use of increased damp protec-

tion for the winding insulation. For extreme operating conditions, the sealing of both the terminal box area and winding-head areas with silicone rubber compound is recommended (see also the section “Design of the stator winding”).

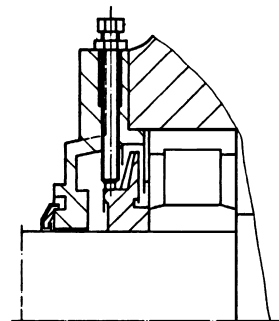
### Bearings

The motors have deep-groove ball bearings at both ends. For special designs with reinforced bearings there is partly a cylindrical roller bearing arranged for adjusting purposes at the driving end side.

Assignment as well as bearing types are indicated in the below table. If special greases are used the motors of frame sizes 071–132 which normally have 2 Z-bearings are provided with Z-bearings.

### Blocking of bearings

Cylindrical roller bearings are sensitive to vibrations during motor standstill. Vibrations occur not only in transit but also at the mounting location due to the influence of other machines. As a result, lengthwise scoring will appear on the inner ring of the roller bearing. In order to avoid this, all motors with roller bearings are equipped with a special blocking system. The rotor shaft is completely blocked by tightening several hexagon bolts, so that vibrations are no longer transmitted to the bearing surface. When the motor is put into service the counternuts should be loosened, the bolts unscrewed a few threads and the nuts tightened again. This will loosen the blocking system and the shaft can rotate freely in the bearings.



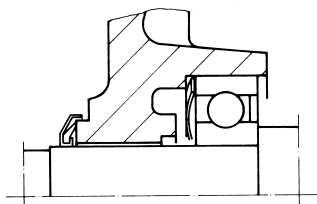
### Antifriction bearings

Frame size	No. of poles	Driving-end bearing		Non-driving end bearing	
		Mounting IM B 3, IM B 5 <sup>1</sup>	Vertical mounting types	Mounting IM B 3, IM B 5 <sup>1</sup>	Vertical mounting types
71	2–8	6203-2Z	6203-2Z	6203-2Z	6203-2Z
80	2–8	6204-2Z	6204-2Z	6204-2Z	6204-2Z
90	2–8	6205-2Z C 3	6205-2Z C 3	6205-2Z C 3	6205-2Z C 3
100	2–8	6206-2Z C 3	6206-2Z C 3	6206-2Z C 3	6206-2Z C 3
112	2–8	6306-2Z C 3	6306-2Z C 3	6306-2Z C 3	6306-2Z C 3
132	2–8	6308-2Z C 3	6308-2Z C 3	6308-2Z C 3	6308-2Z C 3
160	2–8	6310 C 3	6310 C 3	6310 C 3	6310 C 3
180	2–8	6311 C 3	6311 C 3	6311 C 3	6311 C 3
200	2	6312 C 3	6312 C 3	6312 C 3	6312 C 3 *
200	4–8	6312 C 3	6312 C 3	6312 C 3	6312 C 3
225	2	6314 C 3	6314 C 3	6314 C 3	6314 C 3 *
225	4–8	6314 C 3	6314 C 3	6314 C 3	6314 C 3
250	2	6314 C 3	6314 C 3	6314 C 3	6314 C 3 *
250	4–8	6316 C 3	6316 C 3	6316 C 3	6316 C 3
280	2	6316 C 3	6316 C 3	6316 C 3	6316 C 3 *
280	4–8	6317 C 3	6317 C 3	6317 C 3	6317 C 3
315	2	6316 C 3	6316 C 3 *	6316 C 3	6316 C 3
315	4–8	6320 C 3	6320 C 3	6320 C 3	6320 C 3

<sup>1</sup> Mounting IM B 5; only frame sizes 071–315 M.

\* C4-bearing for 60 Hz service.

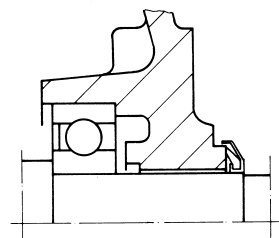
DE bearing



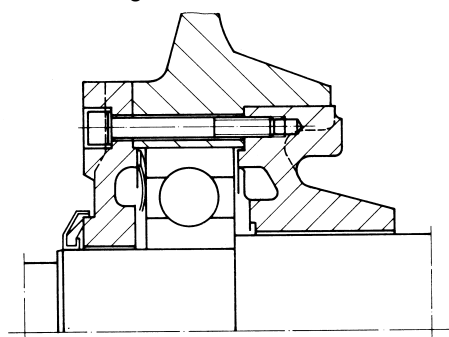
**Frame sizes 71–132**

For frame sizes 112 and 132 a securing ring is provided in the bearing hub at the non-driving end (fixed bearing).

NDE bearing



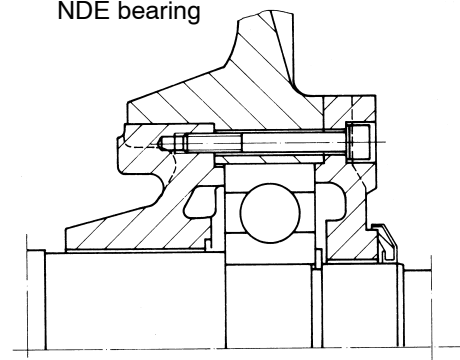
DE bearing



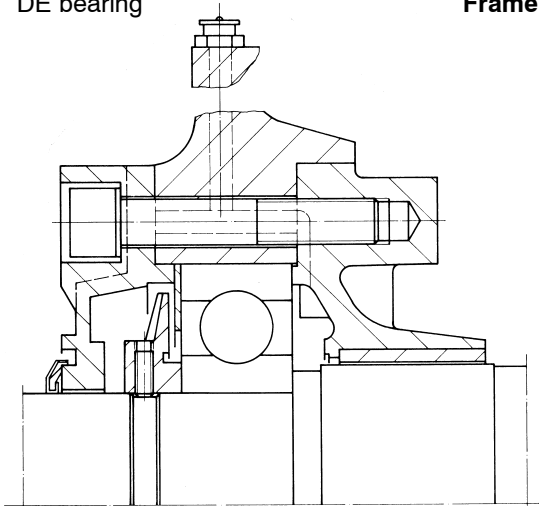
**Frame sizes 160–280**

For frame size 160 the outside bearing cap is cast-on to the end shield.

NDE bearing

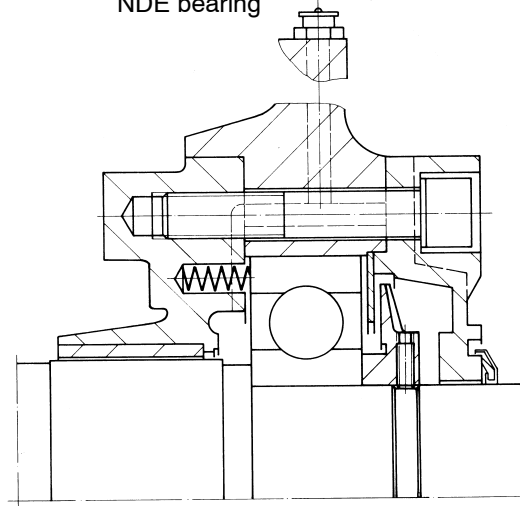


DE bearing



**Frame size 315**

NDE bearing



### Greasing, regreasing device and grease regulation

All the bearings of frame sizes 71 to 280 have permanent lubrication. According to experience the grease filled-in at the factory will be sufficient for several years. The bearings from size 315 (on customer request also for frame sizes 160–280) are fitted with a regreasing and grease regulation which can be used during operation without any risk of overfilling. The grease regulation is based on the centrifugal effect of the ring fixed in front of the bearing and forming at the same time a labyrinth towards the outside, providing a satisfactory sealing. The grease filled in the bearings at our works is sufficient for a certain number of operating hours.

Regreasing frequency and quantities depend on the motor speed, the operating conditions and the size of the bearings. In case of unfavourable operating conditions (e.g. increased ambient temperature, very dusty or corrosive atmosphere, outdoor installation) or motors with vertical shaft the periods decrease by about 30%. They are indicated in the below table. Near the grease nipple of each motor there is also a special instruction plate stating the sort of grease used and the regreasing frequency and quantities. As a general principle a lithium-saponified grease with a melting point above 180°C and suitable for a coolant temperature of –30°C up to +60°C is used for bearing lubrication.

Regreasing or replacement of the grease is only allowed with a grease quality of the same kind (same saponification component or consistency). In case of special operating conditions (e.g. extremely low or high ambient temperatures) special lubricants are used. These are also stated on the instruction plates mentioned above.

### Grease life, grease quantity and relubrication intervals

Frame size	Grease life with permanent lubrication or relubrication interval with regreasing device in service hours at rated speed						Grease quantity in grammes per bearing		
							Permanent lubrication	Relubrication	
	Horizontal mounting (B)			Vertical mounting (V)			Grease filling		
	3000 1/min	1500 1/min	≤ 1000 1/min	3000 1/min	1500 1/min	≤ 1000 1/min			
71	33000	33000	33000	33000	33000	33000	5	—	
80				24000			9	—	
90							11	—	
100				17000	24000		24000	15	—
112								25	—
132	24000	12000	24000	50	—				
160	17000			80	—				
180				100	—				
200				130	—				
225	17000			17000	24000	190	—		
250	17000	—	—	12000	—	—	190	—	
250	—	24000	33000	—	17000	24000	260	—	
280	12000	—	—	9000	—	—	260	—	
280	—	24000	33000	—	17000	24000	310	—	
315	4000	—	—	2800	—	—	—	35	
315	—	8000	11000	—	4000	5600	—	50	

The indicated grease life or relubrication intervals are applicable for an ambient temperature of max. 40°C. For every 10°C temperature rise, the lubrication interval is to be reduced by factor 0.7 of the value shown in the table (max. 20°C = factor 0.5).

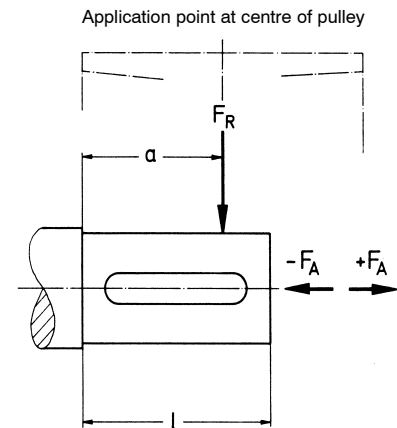
**Twice the grease life can be expected at an ambient temperature of ≤ 25°C, however, 33 000 h at a maximum.**  
Intervals for operation of a 60 Hz power supply on request.

## Permissible forces at shaft end

### Permissible forces at shaft end

Figures are valid for bearings and driving shaft ends in this technical list. They have been based on a

calculated useful life of  $L_{10h} = 20\,000$  hours and are permissible for horizontal and vertical shafts.



### Permissible radial force:

a / l Speed min <sup>-1</sup>	a = 0				a = 0.5 l				a = l			
Frame size	3000	1500	1000	750	3000	1500	1000	750	3000	1500	1000	750
071	0.48	0.54	0.54	0.54	0.39	0.38	0.38	0.38	0.31	0.32	0.32	0.32
080	0.64	0.75	0.75	0.75	0.53	0.53	0.53	0.53	0.41	0.41	0.41	0.41
090	0.74	0.96	1.12	1.21	0.67	0.89	0.93	0.97	0.61	0.74	0.74	0.74
100	1.01	1.33	1.52	1.67	0.91	1.23	1.40	1.40	0.84	1.05	1.03	1.05
112	1.39	1.56	1.53	1.45	1.10	1.05	1.10	1.05	0.86	0.85	0.83	0.80
132	2.10	2.80	3.10	3.50	1.90	2.60	3.00	2.80	1.70	2.10	2.00	2.20
160	3.50	4.60	5.40	5.80	3.20	4.20	3.80	3.80	2.90	3.00	2.20	2.50
180	4.20	5.30	6.30	6.80	3.70	5.00	4.80	6.30	3.30	4.10	3.30	4.00
200	4.60	5.90	6.90	7.80	4.30	5.60	6.70	5.80	3.90	5.30	4.50	3.60
225	5.80	7.60	8.00	8.70	5.40	7.20	4.00	4.00	5.00	4.70	2.90	3.00
250	5.70	8.70	14.50	11.60	5.20	8.10	7.50	6.50	4.80	8.00	5.50	4.30
280	6.60	9.30	10.60	11.60	6.10	9.00	10.10	8.00	5.70	8.60	9.60	6.00
315	6.10	11.70	13.30	15.00	5.70	11.10	12.60	14.30	5.40	10.50	12.00	11.00

For the maximum admissible shaft deflection within the ignition gap, the indicated radial forces are not allowed to be exceeded!

### Permissible axial force:

The following values are permissible for pure axial load. The corresponding bearings are specified in this technical list and calculations

are based on a fatigue life of  $L_{10h} = 20\,000$  hours. The below indicated values are valid for a 50 Hz power supply. For operating

at 60 Hz the values have to be reduced by 6 % in order to achieve the same service life.

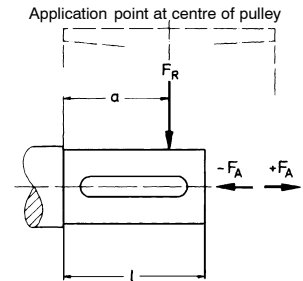
Design Speed 1/min	Horizontal shaft				Vertical shaft – upthrust				Vertical shaft – downthrust			
Frame size +FA or -FA	3000	1500	1000	750	3000	1500	1000	750	3000	1500	1000	750
071	0.40	0.55	0.65	0.73	0.42	0.57	0.67	0.76	0.39	0.53	0.63	0.72
080	0.53	0.73	0.85	0.96	0.56	0.77	0.89	1.00	0.51	0.71	0.82	0.93
090	0.49	0.63	0.77	0.91	0.54	0.69	0.82	0.97	0.46	0.59	0.73	0.87
100	0.87	1.15	1.37	1.55	0.96	1.26	1.48	1.67	0.82	1.09	1.29	1.47
112	1.27	1.64	2.03	2.27	1.36	1.78	2.15	2.39	1.20	1.55	1.95	2.19
132	1.80	2.40	2.90	3.30	2.00	2.70	3.10	3.50	1.70	2.30	2.70	3.10
160	2.70	3.60	4.20	4.80	3.10	4.00	4.70	5.30	2.50	3.30	3.90	4.40
180	3.10	4.10	4.90	5.50	3.60	4.70	5.40	6.10	2.80	3.70	4.50	5.10
200	3.50	4.70	5.50	6.20	4.30	5.60	6.50	7.20	3.00	4.10	5.00	5.70
225	4.40	6.00	7.00	7.90	5.30	7.00	8.20	9.10	3.90	5.30	6.20	7.20
250	4.40	6.90	8.20	9.20	5.50	8.40	9.80	10.80	3.70	6.00	7.10	8.20
280	5.10	7.30	8.70	9.90	6.70	9.40	10.70	11.90	4.00	6.00	7.40	8.60
315	4.90	9.20	10.90	12.30	7.80	12.80	15.20	16.60	2.90	6.80	8.00	9.40

## Additional axial force with radial load at shaft end

### Additional axial force with radial load at shaft end

If the shaft ends are loaded at  $a = l$  with the permissible radial force  $F_R$  applicable in each case, the following additional forces are allowed to occur in axial direction.

If the permissible radial force is not fully utilized, higher loads are possible in axial direction. (Values on request)



Design Speed min <sup>-1</sup>	Horizontal shaft				Vertical shaft – upthrust				Vertical shaft – downthrust			
	3000	1500	1000	750	3000	1500	1000	750	3000	1500	1000	750
Frame size	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
<b>+F<sub>A</sub></b>												
					<b>Shaft end upwards</b> Mounting arrangements IM V3, IM V6, IM V14, IM V19, IM V36				<b>Shaft end downwards</b> Mounting arrangements IM V1, IM V5, IM V10, IM V18, IM V15			
071	0.20	0.31	0.40	0.48	0.21	0.33	0.42	0.50	0.19	0.29	0.38	0.46
080	0.26	0.41	0.53	0.63	0.28	0.45	0.57	0.67	0.24	0.39	0.50	0.61
090	0.28	0.37	0.47	0.60	0.33	0.43	0.53	0.66	0.25	0.33	0.43	0.57
100	0.37	0.45	0.66	0.81	0.46	0.55	0.77	0.92	0.31	0.38	0.59	0.73
<b>-F<sub>A</sub></b>												
					<b>Shaft end downwards</b> Mounting arrangements IM V1, IM V5, IM V10, IM V18, IM V15				<b>Shaft end upwards</b> Mounting arrangements IM V3, IM V6, IM V14, IM V19, IM V36			
071	0.33	0.45	0.55	0.64	0.34	0.48	0.58	0.66	0.32	0.44	0.54	0.63
080	0.43	0.60	0.73	0.84	0.45	0.64	0.77	0.88	0.41	0.57	0.70	0.81
090	0.49	0.63	0.77	0.91	0.54	0.69	0.82	0.97	0.46	0.59	0.73	0.87
100	0.68	0.86	1.07	1.24	0.76	0.96	1.18	1.35	0.62	0.79	1.00	1.16
<b>+F<sub>A</sub> or -F<sub>A</sub></b>												
112	1.05	1.43	1.76	2.00	1.15	1.58	1.88	2.13	0.99	1.34	1.68	1.92
132	1.50	1.90	2.40	2.70	1.60	2.20	2.60	3.00	1.30	1.80	2.30	2.50
160	2.30	3.00	3.70	4.20	2.60	3.50	4.20	4.80	2.00	2.70	3.40	3.90
180	2.60	3.40	4.20	4.70	3.00	4.00	4.80	5.40	2.30	3.00	3.90	4.30
200	3.00	3.80	4.70	5.50	3.70	4.70	5.60	6.40	2.50	3.20	4.10	4.90
225	3.80	4.90	6.20	7.10	4.70	6.00	7.40	8.30	3.20	4.20	5.50	6.40
250	3.70	5.50	7.00	8.20	4.80	6.90	8.50	9.80	2.90	4.50	5.90	7.20
280	4.30	5.40	6.80	8.20	5.90	7.40	8.80	10.20	3.20	4.00	5.50	6.90
315	2.30	4.00	4.70	6.30	5.10	7.50	8.90	10.50	0.20	1.50	1.70	3.40

## Reinforced bearings

The motor design with cylindrical roller bearing at the driving-end side and regreasing device at both ends is an alternative of the standard design.

## Antifriction bearings available

Frame size	No. of poles	Driving-end bearing		Non-driving end bearing	
		Mounting IM B 3, IM B 5 <sup>1</sup>	Vertical mounting types	Mounting IM B 3, IM B 5 <sup>1</sup>	Vertical mounting types
160	2	NU 310E C3	NU 310E C3	6310 C3	6310 C3
180	2	NU 311E C3	NU 311E C3	6311 C3	6311 C3
200	2	NU 312E C3	NU 312E C3	6312 C3	6312 C3 *
200	4-8	NU 312E	NU 312E	6312 C3	6312 C3
225	2	NU 314E C3	NU 314E C3	6314 C3	6314 C3 *
225	4-8	NU 314E	NU 314E	6314 C3	6314 C3
250	2	NU 314E C3	NU 314E C3	6314 C3	6314 C3 *
250	4-8	NU 316E	NU 316E	6316 C3	6316 C3
280	2	NU 316E C3	NU 316E C3	6316 C3	6316 C3 *
280	4-8	NU 317E	NU 317E	6317 C3	6317 C3
315	2	NU 316E C3	NU 316E C3	6316 C3	6316 C3 *
315	4-8	NU 320E	NU 320E	6320 C3	6320 C3

<sup>1</sup> Mounting IM B 5; Only frame sizes 315 M.

\* C4-bearing for 60 Hz service.

## Relubrication intervals and grease quantities

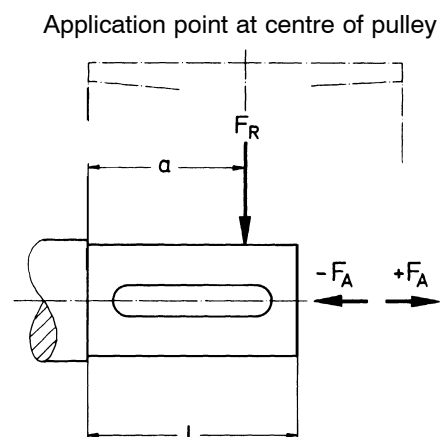
Frame size	Grease life with permanent lubrication or relubrication interval with regreasing device in service hours at rated speed						Grease quantity in grammes per bearing	
	Horizontal mounting (B)			Vertical mounting (V)			Relubrication	Permanent lubrication
	3000 1/min	1500 1/min	≤ 1000 1/min	3000 1/min	1500 1/min	≤ 1000 1/min	Grease filling	
160	17000	—	—	12000	—	—	—	32
180	2800	—	—	2000	—	—	17	—
200	2000	5600	8000	1400	4000	5600	20	—
225		—	—		2800	4000	25	—
250	—	4000	5600	—	—	—	35	—
280		—	—		—	—	35	—
315	—	—	—	—	—	—	35	—
315		2800	—		2000	2800	50	—

The indicated grease life or relubrication intervals are applicable for an ambient temperature of max. 40°C.

For every 10°C temperature rise, the lubrication interval is to be reduced by factor 0.7 of the value shown in the table (max. 20°C = factor 0.5). Intervals for operation of a 60 Hz power supply on request.

## Permissible forces at shaft end

The following values have been based on a calculated useful life of  $L_{10h} = 20\,000$  hours. They are permissible for horizontal and vertical shafts.



## Reinforced bearings

## Weight of rotor

### Permissible radial force:

a / l	a = 0				a = 0.5 l				a = l			
Speed min <sup>-1</sup>	3000	1500	1000	750	3000	1500	1000	750	3000	1500	1000	750
Frame size	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
160	8.5	—	—	—	5.0	—	—	—	2.8	—	—	—
180	10.6	—	—	—	7.5	—	—	—	4.3	—	—	—
200	11.5	14.5	—	—	8.5	8.3	—	—	5.7	5.5	—	—
225	15.6	20.0	—	—	11.0	9.0	—	—	6.5	5.0	—	—
250	15.0	24.6	—	—	10.8	15.0	—	—	6.8	8.0	—	—
280	19.2	23.0	—	—	14.0	14.0	—	—	8.6	9.7	—	—
315	19.0	36.0	—	—	13.8	23.0	—	—	8.6	12.0	—	—

For the maximum admissible shaft deflection within the ignition gap, the indicated radial forces are not allowed to be exceeded!

### Additional axial force with radial load at shaft end

If the shaft ends are loaded at a = l with the permissible radial force  $F_R$  applicable in each case, the following additional forces are allowed to occur in axial direction. If the permissible radial force is not fully utilized, higher loads are possible in axial direction. (Values on request)

Design Speed 1/min	Horizontal shaft				Vertical shaft – upthrust				Vertical shaft – downthrust			
	3000	1500	1000	750	3000	1500	1000	750	3000	1500	1000	750
Frame size + $F_A$ or - $F_A$	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
160	2.3	—	—	—	2.7	—	—	—	2.0	—	—	—
180	2.5	—	—	—	2.9	—	—	—	2.2	—	—	—
200	2.8	3.7	—	—	3.5	4.6	—	—	2.3	3.1	—	—
225	3.6	4.8	—	—	4.5	5.9	—	—	3.1	4.1	—	—
250	3.4	5.5	—	—	4.5	6.9	—	—	2.7	4.5	—	—
280	3.9	5.2	—	—	5.5	7.2	—	—	2.8	3.8	—	—
315	4.0	7.4	—	—	7.0	11.0	—	—	2.0	5.0	—	—

### Weight of rotor (incl. shaft and fan) approx. kg

Frame size	3000 1/min	1500 1/min	1000 1/min	750 1/min	Frame size	3000 1/min	1500 1/min	1000 1/min	750 1/min
71 BG	1.3	1.4	2.3	2.3	180 MB	43	50	—	—
BH	1.5	1.7	3.2	3.2	LB	—	56	51	60
80 BG	2.1	2.4	3.8	3.8	200 LB	66	74	85	84
BH	2.4	2.8	4.0	4.0	LD	69	—	85	—
90 LB	3.3	4.0	4.0	4.0	225 SB	—	85	—	94
LD	3.8	4.8	7.2	7.2	MB	78	95	105	107
100 LB	5.6	5.7	—	8.1	250 MB	98	135	145	145
LD	—	5.9	11	11	280 SG	125	162	180	180
112 MB	8.5	11	19	19.5	MG	145	187	210	215
132 SL	12.5	15.5	—	—	315 SB	200	210	215	215
SN	13.5	—	20	24.5	MB	230	250	250	250
ML	—	20.5	24	—	MC, MD	260	325	350	360
ML	—	—	37	34	LB	300	375	400	420
160 ML	26	33	—	39					
MN	29	—	45	49					
LL	34	40	—	—					



### Terminal box description / Basic layouts

The terminal boxes are designed in protection type “Increased safety” EEx e II in compliance with EN 50014 and EN 50019 and in enclosure IP 55 in compliance with DIN 40050/July 1980 and are made of cast iron. The terminals are therefore protected against accidental contact, dust accumulation and water jets from all directions, provided that the input connecting lead has been installed correctly.

On request, terminal boxes are available in protection type “Flameproof enclosure” in compliance with EN 50014 and EN 50018. The terminal boxes are rotatable at 90° intervals so that the input lead can be connected from several sides. For frame sizes 112–180 a terminal box EEx e II with side-mounted additional box for max. 4 terminals to connect PTC therm-

istors or heating will be available. From frame size 200 onwards a second smaller terminal box for connecting monitoring devices for the winding (e.g. PTC or NTC thermistors) can be fitted beside the terminal box for connecting the winding. In this case it is not possible to have a cable entry from the driving-end.

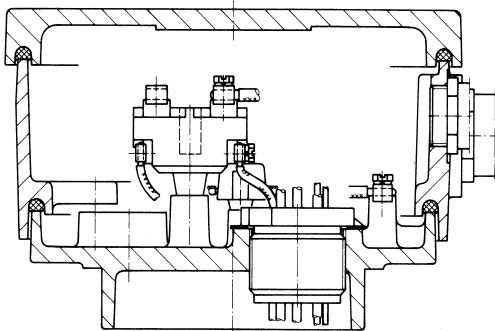
Terminal boxes of flameproof motors are fitted to the top of horizontal mounting types such as IM B 3. The construction of the terminal boxes is illustrated below. The number of terminals, the maximum current per terminal and the cable diameters are shown in the following tables. On request, special designs according to the table “Maximum Number of Terminals” are available.

The type and design possibilities of cable entry parts for input con-

nection leads are shown in the tables and diagrams. The type of monitoring device depends on the number of possible additional terminals in the main terminal box. PTC thermistors in combination with the Loher CALOMAT® device can be connected to two additional terminals. Two terminals are also necessary for connecting a space heater.

The earthing conductor connection is located in the terminal box and the earth terminal is located on the outside of the motor.

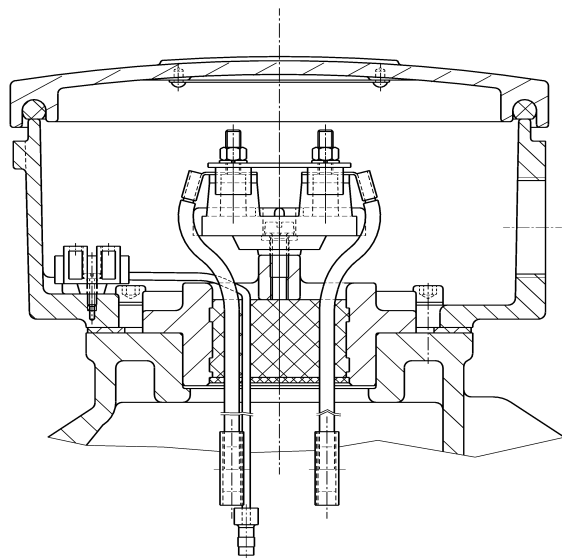
® = Registered trademark of the Loher GmbH



Frame sizes 090–112

Cable gland for multiple stranded cable and terminal board with 6 terminals.

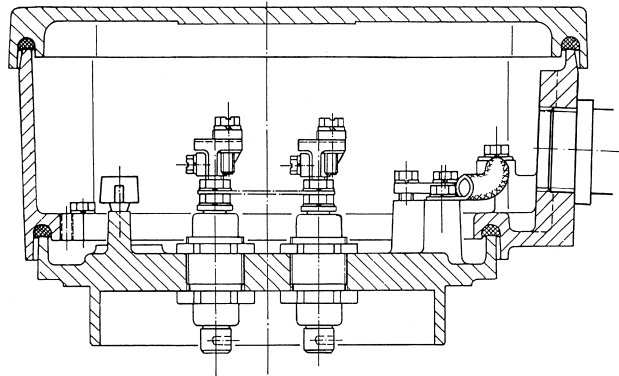
The bushing plate and terminal box of frame sizes 071 and 080 are made in one piece. The design of the terminal box for frame sizes 90–112 corresponds to the above illustration.



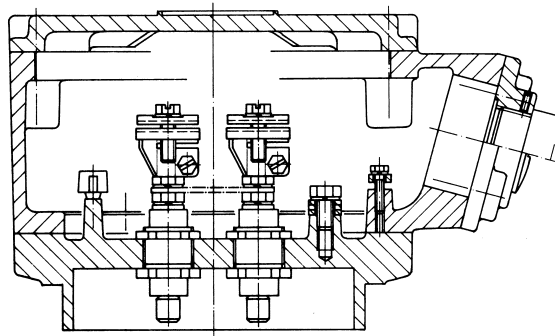
Frame sizes 132–160

Cable gland for multiple stranded cable and terminal board with 6 terminals.

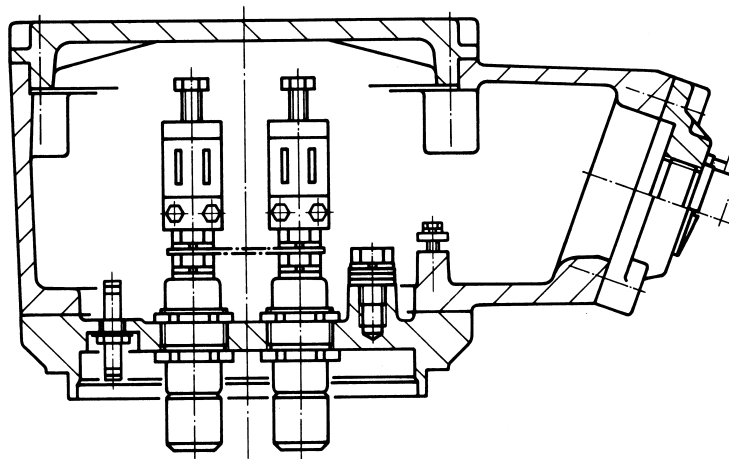
Terminal box



**Frame size 180**  
6 cable glands with  
hinged screw terminals



**Frame sizes 200–280**  
6 cable glands with  
round terminals



**Frame size 315**  
6 cable glands

## Terminals and cable entries

### Terminal box, Type DN..

Enclosure: IP 55  
Protection type: EEx e II to EN 50014 / EN 50019  
Optional: EEx d IIC to EN 50014 / EN 50018  
Housing material: Cast iron

Frame size	Standard version with 6 terminals					Max. possible number of terminals					Additional terminal box Number of terminals x cross section
	Terminal stud	Amperage per terminal [A]	Connection diameter [mm <sup>2</sup> ]	Additional terminals in main terminal box max. number x cross section [mm <sup>2</sup> ] <sup>1</sup>	Max. conductor diameter [mm <sup>2</sup> ]	Number of terminals	Terminal stud	Amperage per terminal [A]	Connection diameter [mm <sup>2</sup> ]	Additional terminals in main terminal box max. number x cross section [mm <sup>2</sup> ] <sup>1</sup>	
071	M 4	22	2.5 6 <sup>2</sup>	4 x 2.5	4 6 <sup>2</sup>	—	—	—	—	—	—
080	M 4	22	2.5 6 <sup>2</sup>	6 x 2.5	4 6 <sup>2</sup>	—	—	—	—	—	—
090	M 4	22	2.5 6 <sup>2</sup>	6 x 2.5	4 6 <sup>2</sup>	—	—	—	—	—	—
100	M 4	22	2.5 6 <sup>2</sup>	6 x 2.5	4 6 <sup>2</sup>	—	—	—	—	—	—
112	M 4	22	2.5 6 <sup>2</sup>	6 x 2.5	4 6 <sup>2</sup>	—	—	—	—	—	—
132	M 5	52	10 25 <sup>2</sup>	4 x 2.5	25	—	—	—	—	—	4 x 2.5 <sup>3</sup>
160	M 5	52	10 25 <sup>2</sup>	4 x 2.5	25	—	—	—	—	—	4 x 2.5 <sup>3</sup>
180	M 8	100	2.5–35	10 x 2.5	35	12	M 5	52	10	6 x 2.5	4 x 2.5 <sup>3</sup>
200	M 10	200	6–70	6 x 2.5	70	9	M 5	100	2.5–35	4 x 2.5	10 x 2.5
225	M 10	200	6–70	6 x 2.5	70	9	M 6	100	2.5–35	4 x 2.5	10 x 2.5
250	M 10	200	6–70	6 x 2.5	70	9	M 6	100	2.5–35	4 x 2.5	10 x 2.5
280	M 12	315	10–95	6 x 2.5	150	9	M 10	200	6–70	4 x 2.5	10 x 2.5
315 S, M	M 12	315	16–150	6 x 2.5	150	12	M 8	100	2.5–35	4x 2.5	10 x 2.5
						9	M 10	200	6–70		
315 L	M 16	400	120–300	9 x 2.5	150	12	M 8	100	2.5–35	6 x 2.5	28 x 2.5
						9	M 12	200	6–70		

<sup>1</sup> Rated voltage 420V

<sup>2</sup> Max. cross section with cable lug

<sup>3</sup> EEx d – additional terminal box not available.

Number and size of the entry threads see dimension drawing.

Cable glands (on special order) see below table.

### Cable glands for Type DN..

For delivery the entry threads are sealed with certified plugs.

Only on special order the terminal boxes are delivered with cable gland according to the table.

Special glands on request.

Frame size	Standard cable glands			Entry thread max. <sup>3</sup>			Entry thread max. max. <sup>3</sup>		
	Terminal box EEx protection	EEx e II	EEx d IIC	EEx e II			EEx d IIC		
	Cable gland type	HSK-M-Ex <sup>2</sup>	ADL 1 F						
	Entry thread <sup>1</sup>	Cable diameter [mm]	Cable diameter [mm]	Number	metric	NPT <sup>4</sup>	Number	metric	NPT <sup>4</sup>
071	1 x M 25 x 1.5	10–16	11–20	2	M 25 x 1.5	3/4 "	1	M 25 x 1.5	1 1/2 "
080	1 x M 25 x 1.5	10–16	11–20	2	M 32 x 1.5	1 "	1	M 32 x 1.5	1 1/2 "
090	1 x M 25 x 1.5	10–16	11–20	2	M 32 x 1.5	1 "	1	M 32 x 1.5	1 1/2 "
100	1 x M 32 x 1.5	13–20	16–27.5	2	M 32 x 1.5	1 "	1	M 32 x 1.5	1 1/2 "
112	2 x M 32 x 1.5	13–20	16–27.5	2	M 32 x 1.5	1 "	2	M 32 x 1.5	1 1/2 "
132	2 x M 32 x 1.5	13–20	16–27.5	2	M 50 x 1.5	2 "	2	M 50 x 1.5	1 3/4 "
160	2 x M 40 x 1.5	22–32	22–33	2	M 50 x 1.5	2 "	2	M 50 x 1.5	1 3/4 "
180	2 x M 40 x 1.5	22–32	22–33	2	M 63 x 1.5	2 "	2	M 50 x 1.5	1 3/4 "
200	2 x M 50 x 1.5	32–38	30–44	2	M 63 x 1.5	2 "	2	M 63 x 1.5	2 1/4 "
225	2 x M 50 x 1.5	32–38	30–44	2	M 63 x 1.5	2 "	2	M 63 x 1.5	2 1/4 "
250	2 x M 63 x 1.5	37–44	40–57	2	M 63 x 1.5	2 "	2	M 63 x 1.5	2 1/4 "
280	2 x M 63 x 1.5	37–44	40–57	2	M 75 x 1.5	2 1/2 "	2	M 75 x 1.5	3 1/2 "
315	2 x M 63 x 1.5	37–44	40–57	2	M 100 x 1.5	3 1/2 "	2	M 100 x 1.5	3 1/2 "

Entry threads for PTC thermistors, heating:

EEx e II: M20x1.5

EEx d IIC: M20x1.5

D = 6–12 mm

D = 3–15 mm

<sup>1</sup> Number and size of entry threads to DIN 42925

<sup>2</sup> Cable glands are suitable for unshielded and non-armoured cables and leads.

<sup>3</sup> Other threads, number and size on request.

<sup>4</sup> Cable glands for NPT-threads not available.

### Electrical design of the series DN..

The motors of the series DNGW are available in explosion protection "Flameproof enclosure".

On customer request the motors can be delivered for a fixed voltage (e.g. 400V) or for a voltage range (e.g. 380–420V).

The rated voltages  
400V or 380–420V  
500V or 475–525V  
690V or 655–725V

are standard voltages for 50 Hz systems. Other voltages and frequencies are possible on request. The outputs and electrical data indicated in the tables can be changed by special designs, achieving e.g. an even higher efficiency or higher output at unchanged thermal utilization by means of a rotor with copper cage instead of aluminium die cast.

The insulation system of this motor series is suitable for mains voltages up to 1000V. The connecting (terminal box, terminals) is designed for rated voltages up to 750V. From frame sizes 180 a special design for rated voltages up to 1100V is available.

The general use of overcoat double-enamelled wires and optimized impregnating methods also allows an inverter operation for most motors of this series without modifying the electrical design. The permissible basic data and parameters for inverter operation are summarized in our Technical List UN 03. It is provided, however, that the motor is equipped with PTC thermistors. These are installed into the stator winding and act in case of inverter operation as sole motor protection together with a tripping device (e.g. LOHER Calomat) which is certified by the PTB. No motor protection circuit breakers are necessary. In most cases PTC thermistors with nominal shutdown temperature of

145°C ("KL145") are used. Normally, such inverter motors are stamped with duty type S1 or S9.

More complicated is when PTC thermistor-type protection (sole protection) at mains operation is selected, since the load case "locked shaft, motor draws full starting current" has also to be monitored. Considering the rotor only PTC thermistors with low tripping temperature can partly be used here.

The advantage is that all "mains duty types" (S1–S7) and the "inverter operation" (S9) are covered. These motors are stamped with S1–S7, S9.

The larger the motor and the lower the number of poles, the more difficult is it to realize the sole protection at the mains by means of PTC thermistors: Due the principles of growth larger machines always become "more critical for the rotor". Typically, this limit for sole protection of 4-pole motors is at shaft height 280.

The flameproof motors are fitted with 6 terminals, allowing "star" (Y) or "delta" ( $\Delta$ ) connection. Standard connection of all 400V motors is delta and therefore suitable for 400V  $\Delta$ /690V Y as well as for Y- $\Delta$  starting at 400V.

The 500V motors are available both for 500V Y and 500V  $\Delta$ , if not for winding reasons one of the both versions is to be preferred.

The motors of the series DNG. have the winding executed in class F insulation, thermal utilization only to class "B".

In accordance with the latest standard EN 60034-1 the thermal utilization, if it is inferior to the insulation class, will be stamped on the rating plate additionally to the insulation class. Therefore the fixed voltage motors of this series will be stamped with "F–B". Only few exceptions require "F". They are

marked with an \* in the output tables and stamped with "F".

Both for fixed voltage (e.g. 400V, 500V or 690V) and voltage range (e.g. 380–420V, 475–525V or 655–725V) a tolerance of  $\pm 5\%$  for the "Range A" is admissible to EN 60034-1 ("VDE 0530"). This results in the following:

For the fixed voltage motor, e.g. 400V, this "Range A" goes from 380–420V.

Within this range the motor must be reliably functioning in continuous duty, the temperature rise of the winding at the tolerance limits is allowed to be approx. 10 K higher than the limit value of the insulation class.

The electrical data ("Rated data") always refer to the mean range, e.g. to 400V. Here the temperature rise of the winding is measured and the thermal utilization is determined.

The upper and lower limit of "Range A" is joined by "Range B". Its tolerance limits are at  $\pm 10\%$  of the rated voltage. For the 400V motor these are e.g. 360–440V. An operation at these tolerance limits of "B" for a longer time is not recommended however, the motor must still be reliably functioning and is not allowed to differ essentially from the characteristic data.

Accordingly, the tolerance limits of "Range A" are between 361V and 441V for the voltage range motor (e.g. 380–420V). "Range B" starts at 342V and ends at 462V. (see chart in section "Electrical design, general / Standard voltages and tolerances"). A motor being stamped e.g. with 380–420V is to keep the limit temperature according to its insulation class at every voltage between 380V and 420V, 10 K more are allowed between 361 and 380V as well as between 420 and 441V.

All motors of the series DNGW being operated in the mean range will be utilized to insulation class "B".

At the rated voltage limits of the wide voltage range motors a slightly higher temperature rise than in the mean range can occur. Therefore, these are generally marked on the rating plate as follows:

400V: F–B, 380–420V: F

The few exceptions are motors for which insulation class F is already required at mid-voltage. They are marked with an \* and stamped with "F".

Since there is sometimes uncertainty about the stamp data, utilization and guaranteed data of the wide voltage range motor a detailed description is given below:

For the voltage range motors (e.g. 380–420V) of the series D.G. the electrical data are measured in the mean range (e.g. at 400V) at rated output first. Obtained are the power factor, efficiency, speed (torque), starting current ( $I_A$  absolute), noise, torque characteristic, temperature rise of the winding and no-load data.

All guaranteed data indicated in this list or in the data sheet must meet within the tolerances these measured values at mid-voltage.

Maintaining the torque calculated from the rated output and the rated speed ("rated torque"), the currents at the limits of the rated voltage (e.g. at 380V and at 420V) are still to be determined now.

The maximum current from the rated voltage range (e.g. 380–420V) is determined as rated current and stamped onto the rating plate.

(For the fixed voltage motor only the "mid-current", which means e.g. at 400V, is decisive).

For rating and Ex-approval of the voltage range motor this means that the worst value within the voltage range (at maximum current of this range) is decisive for the temperature rise of the flameproof enclosure. This means that even at the most unfavourable constellation these limit temperatures at the outer surface of the flameproof enclosures are kept, which are admissible according to the respective temperature class. (The motors of this list are certified for T4, which means the admissible surface temperature is max. 120°C).

The stamped-on currents of the voltage range motor are on average by approx. 5% higher than

those of the fixed voltage motor of the same output. Therefore the value of the relative starting current " $I_A/I_N$ " is lower by approx. 5%.

Special case "Voltage variation" Especially in English-speaking countries the voltage range motor (e.g. 380–420V) according to the European Standard and the European understanding is less known. Instead of it a voltage tolerance, e.g.  $\pm 10\%$ , which is mostly also involved with a relating frequency tolerance of e.g.  $\pm 5\%$  is more common.

This kind of test and stamp can also be applied by us. In this case the motor will be tested at  $-10\%$  of the rated voltage and 100% rated torque as well as at  $+10\%$  of the rated voltage and  $+100\%$  rated torque (which has been determined at rated output and mid-voltage). It is assumed that there may be a voltage variation in the indicated tolerance range, however, during most of the operating time the mid-voltage (e.g. 400V) is applied to the motor.

Therefore that current is stamped as rated current which flows at rated output and mid-voltage. A test evidence that all limit temperatures are kept in the voltage range at rated torque is sufficient.

## Type series DN.. , Special designs

for flameproof TEFC motors

Frame size	071	080	090	100	112	132	160	180	200	225	250	280	315
Mounting types IM B6, IM B7, IM B8, IM V6	○	○	○	○	○	○	○	○	○	○	○	○	●
IM B5, IM V3	●	●	●	●	●	●	●	●	●	●	●	●	●
IM V1, IM V5	●	●	●	●	●	●	●	●	●	●	●	●	●
IM B35, IM V15	●	●	●	●	●	●	●	●	●	●	●	●	●
IM B14, IM B34, IM V18, IM V19 <sup>1</sup>	●	●	●	●	●	●	A	A	A	A	A	A	A
Protection type EEx de IIB up to CT 70°C	●	●	●	●	●	●	●	●	●	●	●	●	●
Radial shaft sealing ring at driving end	N	N	N	N	N	N	●	●	●	●	●	●	●
Labyrinth ring for external bearing sealing	N	N	N	N	N	N	N	●	●	●	●	●	●
Fixed bearing at driving end	●	●	●	●	●	●	●	●	●	●	●	●	○
Fixed bearing at non-driving end	N	N	N	N	N	○	○	○	○	○	○	○	●
Regreasing device	N	N	N	N	N	N	●	●	●	●	●	●	○
Cyl. roller bearing, DE	N	N	N	N	N	N	●	●	●	●	●	●	●
Flange with tolerance R (reduced) acc. to DIN 42955	●	●	●	●	●	●	●	●	●	●	●	●	●
Fan made of brass	N	N	N	N	N	●	●	●	●	●	●	●	●
Forced ventilation	N	N	N	A	A	●	●	●	●	●	●	●	●
Additional terminal box for thermal control <sup>2</sup>	N	N	N	N	N	●	●	●	●	●	●	●	●
Terminal box in protection type "Flameproof enclosure"	●	●	●	●	●	●	●	●	●	●	●	●	●
Second standard shaft end	●	●	●	●	●	●	●	●	●	●	●	●	●
Non-standard shaft end	●	●	●	●	●	●	●	●	●	●	●	●	●
Vibration level R (reduced) or S (special) <sup>3</sup>	●	●	●	●	●	●	●	●	●	●	●	●	●
Noise class 3 <sup>4</sup>	N	N	N	N	A	●	●	●	●	●	●	●	●
Non-standard voltage up to 690V and/or frequency	●	●	●	●	●	●	●	●	●	●	●	●	●
Insulation class H	●	●	●	●	●	●	●	●	●	●	●	●	●
Sealing of winding heads	N	N	●	●	●	●	●	●	●	●	●	●	●
Fully insulated against moisture or acids	●	●	●	●	●	●	●	●	●	●	●	●	●
Built-in PTC thermistors	●	●	●	●	●	●	●	●	●	●	●	●	●
Built-in NTC thermistors <sup>5</sup>	N	N	N	N	N	N	N	N	●	●	●	●	●
Built-in space heater	●	●	●	●	●	●	●	●	●	●	●	●	●
SPM-nipples	N	N	N	N	N	●	●	●	●	●	●	●	●
Bearing thermometer	N	N	N	N	N	N	N	N	A	A	A	A	●
Reverse lock	N	N	●	●	●	●	●	●	●	●	●	●	●
Tachometer	N	N	N	A	A	●	●	●	●	●	●	●	●
Other colours than RAL 7030	●	●	●	●	●	●	●	●	●	●	●	●	●
Special painting N14, N14A, Z21, Z05, J08, S10, G04	●	●	●	●	●	●	●	●	●	●	●	●	●
VIK-design	●	●	●	●	●	●	●	●	●	●	●	●	●
Design for increased ambient temperatures	●	●	●	●	●	●	●	●	●	●	●	●	●
Design for ambient temperatures up to -55°C without heating	●	●	●	●	●	●	●	●	●	●	●	●	●

<sup>1</sup> Only up to frame size 112 acc. to DIN 42677.

<sup>2</sup> Additional terminal box with max. 4 terminals for frame sizes 132–180 located on the EEx e main terminal box.

<sup>3</sup> Vibration level S (special) on request, possibly only available with output reduction.

<sup>4</sup> Noise class 3 not available for all frame sizes and speeds.

<sup>5</sup> Additional terminal box necessary for NTC thermistors.

○ no extra charge

● extra charge

A on request

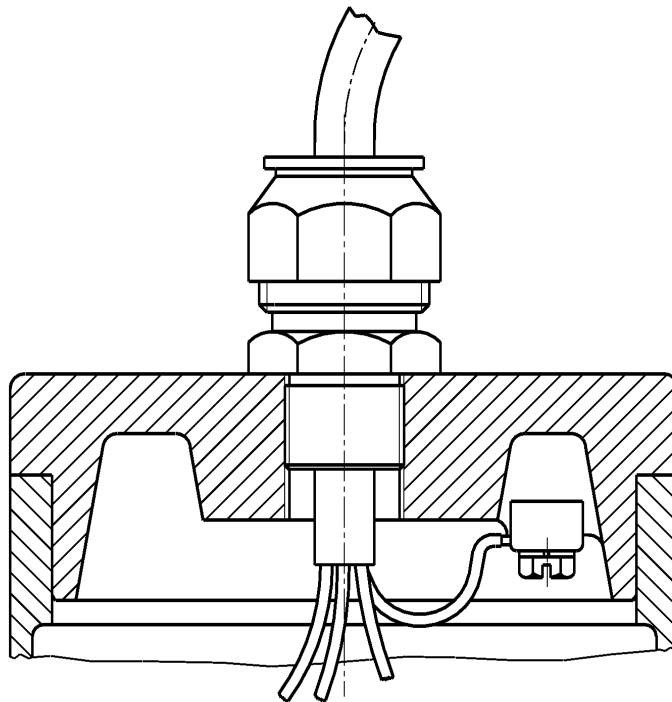
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### Three-phase motors with led out cable

Three-phase motors with led out connecting cable are used in machines or ventilating equipment where due to the narrow space conditions the electrical connection is made via a separately located terminal box.

**Design:**  
The motors correspond with the TEFC designs in this technical list, only that instead of the terminal box a bushing plate is installed.  
**Explosion protection:**  
II 2 G EEx d IIC T4  
See dimension drawings for frame sizes and mounting types.

The loose end of the connection cable must be indicated in the order, standard length 1.5m. Two or more cable entries are used for pole-changing motors or single-speed motors with a rated current > 70A. Admissible coolant temperature  $-20^{\circ}\text{C}$  up to  $+50^{\circ}\text{C}$ .



Connection cable (standard design)  
Type: NssHöu-J  
Rated voltage: 1000V  
Max. operating temperature at the conductor:  $-20^{\circ}\text{C}$  up to  $+90^{\circ}\text{C}$

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## Explosion-proof three-phase motors

Protection type “d” for ambient temperatures up to  $-55^{\circ}\text{C}$

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### Application ranges

Hazardous areas in chemical industry, in process engineering,  
in off-shore and on-shore plants, where the ambient temperature,  
especially in polar regions, can fall below  $-20^{\circ}\text{C}$ .

#### Advantages:

Without an expensive auxiliary heating the motors can be used at ambient temperatures up to  $-55^{\circ}\text{C}$ . Expensive control and monitoring devices, corresponding cables and power supply lines as well as heating energy are not necessary.

#### Explosion protection:

acc. to European Standards  
EN 50014, EN 50018, EN 50019

#### Marking:

EEx de IIC T4

#### Certificates:

EC-Type-examination test certificate  
GOST certificate

#### Ambient temperature range:

$-55^{\circ}\text{C}$  up to  $+60^{\circ}\text{C}$

**Type series:** D...-071... D...-100... D...-160... D...-225... D...-315...  
D...-080... D...-112... D...-180... D...-250...  
D...-090... D...-132... D...-200... D...-280...

#### Output:

0.25 kW up to 200 kW at  $1500\text{ min}^{-1}$

#### Rated voltage $U_N$ :

up to 690V

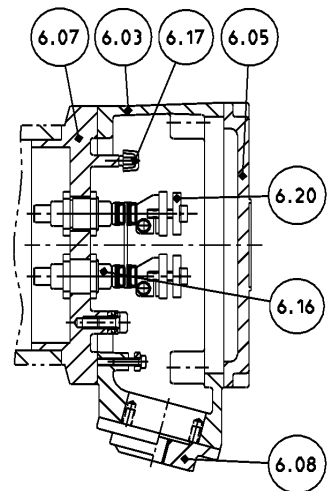
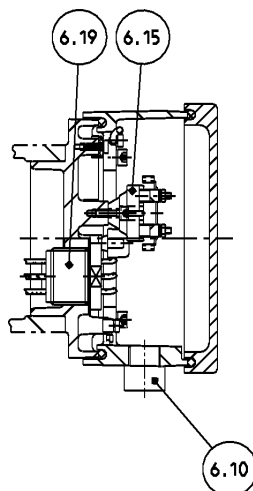
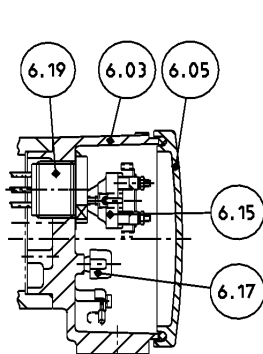
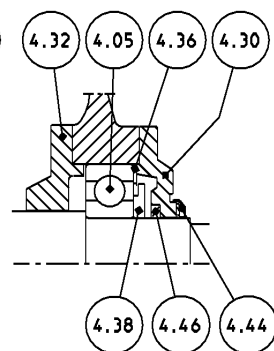
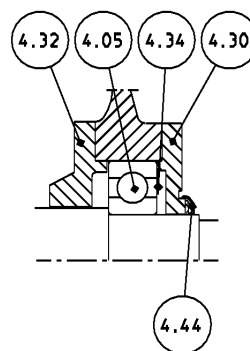
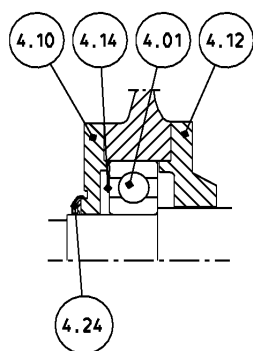
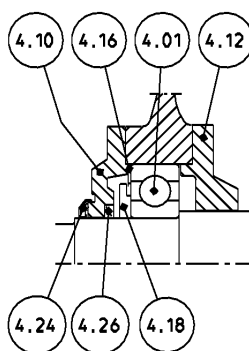
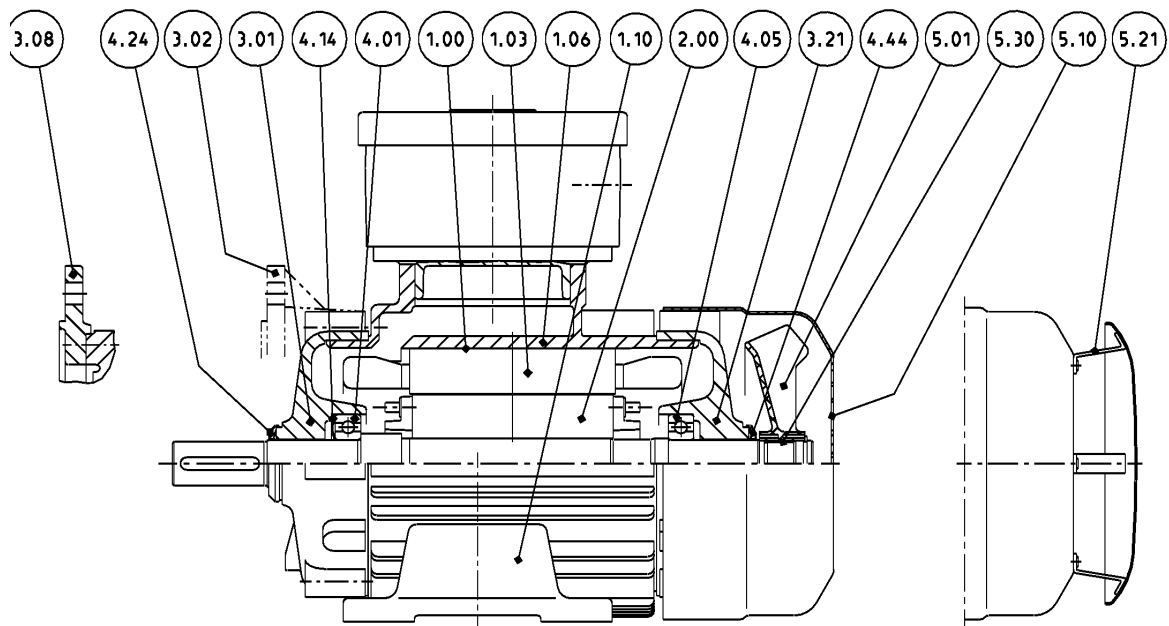
#### Design:

- Enclosure acc. to IEC 34-5: IP 55
- Insulation class F
- Material selection for temperatures up to  $-55^{\circ}\text{C}$
- Group IIC (also in compliance with the requirements of groups IIB and IIA).
- **Not available for ambient temperatures up to  $-55^{\circ}\text{C}$ :**  
Motors with cable outlet, attachments, e.g. with brake, tachometer, reverse lock, forced ventilation.

#### Note:

Fan must not be blocked by ice or snow.





- 1.00 Stator, complete
- 1.03 Stator core with winding
- 1.06 Stator housing
- 1.10 Mounting feet, unmachined (1 pair)

- 2.00 Rotor, complete (balanced)

- 3.01 End shield, DE
- 3.02 Flange shield, DE
- 3.08 Flange disk, DE
- 3.21 End shield, NDE

- 4.01 Bearing, DE
- 4.05 Bearing, NDE
- 4.10 Outside bearing cap, DE
- 4.12 Inner bearing cap, DE
- 4.14 Resilient preloading ring, DE
- 4.16 Grease guide disk, DE
- 4.18 Centrifugal disk, DE
- 4.22 Felt packing ring, DE
- 4.24 Outside gasket, DE
- 4.26 Inner gasket, DE
- 4.30 Outside bearing cap, NDE
- 4.32 Inner bearing cap, NDE
- 4.34 Resilient preloading ring, NDE
- 4.36 Grease guide disk, NDE
- 4.38 Centrifugal disk, NDE
- 4.44 Outside gasket, NDE
- 4.46 Inner gasket, NDE

- 5.01 External fan, complete
- 5.10 Fan cover, complete
- 5.21 Protective cover, complete
- 5.30 Spring fastener

- 6.03 Base of terminal box
- 6.05 Terminal box cover
- 6.07 Bushing plate
- 6.08 Cable gland
- 6.10 Cable entry
- 6.15 Terminal board, complete
- 6.16 Bushing terminal
- 6.17 Accessory terminal
- 6.19 Cable gland for stranded cable
- 6.20 Clamping

The parts shown are available in different sets depending on type, size, mounting and enclosure. They are available from our works. Standard parts such as bolts, spring washers etc. are available anywhere.

**When ordering spare parts, please state:**

**Spare part designation  
Motor type  
Serial number**

**Example:**

<b>3.01 End shield, DE</b> <b>DNGW-200LB-08</b> <b>3 386 388</b>
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## Series DN... / DV..., Output tables

**Three-phase motors with squirrel cage**  
**Totally enclosed fan-cooled, enclosure IP 55**  
**Protection type “Flameproof Enclosure” EEx de IIC**

**400V – 50 Hz**  
**Class F insulation, Utilization to B**  
**Temperature class T4**

**Types: DNGW / DNSW      Number of poles: 2      – 50 Hz**

Type	Rated output	Rated speed	Rated current at	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
			400V				with direct-on starting as a multiple of the				
							rated torque	rated torque	rated current		
	kW	1/min	A	%	cos $\varphi$		$M_A/M_N$	$M_K/M_N$	$I_A/I_N$	kg m <sup>2</sup>	approx. kg
<b>Speed 3000 min<sup>-1</sup></b>											
DNGW-071BG-02	0.37	2770	1.00	66	0.83	HS 5	2.6	2.7	4.8	0.0003	12
DNGW-071BH-02	0.55	2765	1.35	69	0.86	HS 5	2.5	2.65	4.8	0.0004	13
DNGW-080BG-02	0.75	2820	1.74	76	0.83	HS 5	2.9	2.9	6.0	0.0006	20
DNGW-080BH-02	1.1	2800	2.5	77	0.84	HS 5	3.1	3.0	5.5	0.0008	22
DNGW-090LX-02	1.5	2835	3.2	78.4	0.88	HS 5	2.5	2.7	5.9	0.0020	32
DNGW-090LD-02	2.2	2850	4.6	81.3	0.88	HS 5	2.9	3.0	6.4	0.0020	32
DNGW-100LB-02	3.0	2880	6	84.2	0.88	HS 5	2.7	3.0	7.0	0.0039	37
DNGW-112MB-02	4.0	2880	7.5	85.5	0.92	HS 5	2.9	3.5	7.2	0.0060	55
DNGW-132SL-02	5.5	2900	10.6	86.5	0.88	HS 5	3.0	3.3	6.6	0.0110	85
DNGW-132SN-02	7.5	2910	14.5	88	0.88	HS 5	3.4	3.8	7.4	0.0140	90
DNGW-160ML-02	11	2920	21	88.5	0.87	HS 5	2.7	2.9	5.9	0.0364	150
DNGW-160MN-02	15	2920	28	90	0.89	HS 5	2.7	3.0	6.0	0.045	155
DNGW-160LL-02	18.5	2920	33	91	0.90	HS 5	2.9	3.0	6.4	0.057	170
DNGW-180MB-02	22	2950	41.5	91	0.87	HS 5	2.2	3.0	7.0	0.094	190
DNGW-200LB-02	30	2960	52	92.5	0.91	HS 4	2.4	2.6	7.4	0.182	310
DNGW-200LD-02	37	2955	65	93	0.90	HS 4	2.6	2.8	7.5	0.200	325
DNGW-225MB-02	45	2965	79	93.5	0.89	HS 5	2.2	2.7	7.1	0.247	375
DNGW-250MB-02	55	2975	99	94.1	0.86	HS 5	2.3	3.2	7.4	0.45	500
DNGW-280SG-02	75	2980	130	94.7	0.89	HS 4	2.2	2.2	6.8	0.88	725
DNGW-280MG-02	90	2975	155	95	0.90	HS 4	2.0	2.2	6.5	1.03	775
DNSW-315SB-02	110	2975	190	95	0.89	DS 4	2.0	2.4	6.5	1.61	950
DNSW-315MB-02	132	2980	225	95.5	0.89	DS 4	2.0	2.4	6.5	1.91	1030
DNSW-315MD-02	160	2980	275	95.8	0.89	DS 4	2.3	2.6	6.7	2.3	1100
DNSW-315LB-02	200	2980	335	96	0.90	DS 4	2.5	2.7	6.8	2.8	1350

Higher outputs, other voltages and frequencies on request.  
 Temperature classes T5 and T6 on request.

Type series D

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**400V – 50 Hz**  
 Class F insulation, Utilization to B  
**Temperature class T4**

**Types: DNGW / DNSW      Number of poles: 4      – 50 Hz**

Type	Rated output	Rated speed	Rated current at	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
			400V					with direct-on starting as a multiple of the			
	kW	1/min	A	%	cos $\varphi$		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
							$M_A/M_N$	$M_K/M_N$	$I_A/I_N$		
<b>Speed 1500 min<sup>-1</sup></b>											
DNGW-071BG-04	0.25	1350	0.77	60	0.78	HS 4	2.4	2.4	3.6	0.0007	12
DNGW-071BH-04	0.37	1360	1.1	65	0.77	HS 5	2.5	2.5	3.6	0.0009	13
DNGW-080BG-04	0.55	1400	1.5	70	0.77	HS 4	2.1	2.3	4.0	0.0015	20
DNGW-080BH-04	0.75	1380	1.9	73	0.79	HS 4	2.0	2.1	3.8	0.0020	22
DNGW-090LX-04	1.1	1400	2.6	77	0.83	HS 4	2.1	2.3	5.0	0.0036	32
DNGW-090LD-04	1.5	1410	3.4	79	0.83	HS 5	2.5	2.7	5.1	0.0036	32
DNGW-100LB-04	2.2	1400	4.8	81	0.84	HS 5	2.2	2.5	5.3	0.0051	37
DNGW-100LD-04	3.0	1410	6.6	82.6	0.82	HS 5	2.5	2.7	5.8	0.0066	40
DNGW-112MB-04	4.0	1415	8.3	84	0.84	HS 5	2.2	2.6	5.9	0.012	57
DNGW-132SL-04	5.5	1440	11	87	0.85	HS 5	2.3	2.7	6.4	0.022	85
DNGW-132ML-04	7.5	1445	15	88	0.85	HS 5	2.6	3.0	7.2	0.030	100
DNGW-160ML-04	11	1460	21	90	0.84	HS 5	2.5	2.4	6.1	0.068	150
DNGW-160LL-04	15	1455	29	90.7	0.85	HS 4	2.9	2.3	6.2	0.092	180
DNGW-180MB-04	18.5	1465	34.5	91.3	0.86	DS 5	2.9	2.6	6.8	0.13	190
DNGW-180LB-04	22	1465	41	91.9	0.86	DS 5	2.9	2.5	6.7	0.16	210
DNGW-200LB-04	30	1465	55	92.5	0.87	HS 4	2.4	2.2	6.4	0.25	310
DNGW-225SB-04	37	1470	68	93	0.87	HS 4	2.2	2.2	6.3	0.35	360
DNGW-225MB-04	45	1475	84	93.2	0.84	HS 5	2.6	2.5	6.7	0.41	400
DNGW-250MB-04	55	1480	97	94.5	0.88	HS 5	2.4	2.9	7.6	0.80	510
DNGW-280SG-04	75	1480	132	94.7	0.88	HS 4	2.2	2.5	6.5	1.44	750
DNGW-280MG-04	90	1480	157	95	0.88	HS 4	2.3	2.5	6.5	1.65	800
DNSW-315SB-04	110	1485	200	95.2	0.85	DS 4	2.1	2.3	6.5	2.4	980
DNSW-315MB-04	132	1485	240	95.5	0.85	DS 4	2.1	2.3	6.5	2.9	1050
DNSW-315MD-04	160	1485	285	95.6	0.86	DS 4	2.1	2.2	6.5	3.4	1120
DNSW-315LB-04	200	1485	355	95.7	0.85	DS 4	2.5	2.5	6.6	4.0	1350

Higher outputs, other voltages and frequencies on request.  
 Temperature classes T5 and T6 on request.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**400V – 50 Hz**  
Class F insulation, Utilization to B  
**Temperature class T4**

**Types: DNGW / DNSW      Number of poles: 6      – 50 Hz**

Type	Rated output	Rated speed	Rated current at	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
			400V				with direct-on starting as a multiple of the				
	kW	1/min	A	%	cos $\varphi$		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
							$M_A/M_N$	$M_K/M_N$	$I_A/I_N$		
<b>Speed 1000 min<sup>-1</sup></b>											
DNGW-071BH-06	0.25	870	0.88	59	0.71	HS 4	2.0	1.8	2.7	0.0009	15
DNGW-080BG-06	0.37	890	1.24	64	0.71	HS 4	2.0	2.1	3.3	0.0015	20
DNGW-080BH-06	0.55	885	1.70	65	0.72	HS 4	2.0	2.1	3.2	0.0020	22
DNGW-090LX-06	0.75	900	2.2	68.3	0.76	HS 4	1.6	1.9	3.2	0.0036	30
DNGW-090LD-06	1.1	915	3.3	72	0.72	HS 4	2.0	2.3	3.3	0.0036	30
DNGW-100LB-06	1.5	940	4.2	76.4	0.70	HS 4	2.2	2.5	4.4	0.0086	40
DNGW-112MB-06	2.2	940	5.3	80	0.77	HS 3	1.7	2.0	4.2	0.014	60
DNGW-132SL-06	3.0	955	6.3	85.6	0.81	HS 4	2.2	2.7	6.0	0.030	85
DNGW-132ML-06	4.0	955	8.8	84.7	0.81	HS 4	2.3	2.6	5.5	0.033	90
DNGW-132MN-06	5.5	955	11.8	86	0.82	HS 5	2.6	2.6	6.0	0.045	95
DNGW-160ML-06	7.5	970	16.0	87.9	0.81	HS 5	2.4	2.8	7.0	0.100	150
DNGW-160LL-06	11	965	22.5	88.8	0.82	HS 5	2.4	2.8	6.4	0.134	180
DNGW-180LB-06	15	965	30.5	90	0.80	HS 4	1.6	2.6	5.5	0.13	210
DNGW-200LB-06	18.5	970	36	90.8	0.83	DS 4	2.2	2.0	5.0	0.33	320
DNGW-200LD-06	22	965	44	90.9	0.81	DS 4	2.3	2.0	5.0	0.33	330
DNGW-225MB-06	30	975	58	91.8	0.83	DS 5	2.6	2.3	5.8	0.55	385
DNGW-250MB-06	37	985	73	92.5	0.80	DS 4	2.3	2.2	6.6	1.00	510
DNGW-280SG-06	45	985	81	93.3	0.87	DS 4	2.1	2.1	6.2	1.87	750
DNGW-280MG-06	55	985	100	93.4	0.86	DS 4	2.1	2.4	6.2	2.3	800
DNSW-315SB-06	75	990	136	94.6	0.85	DS 4	2.2	2.3	6.6	3.3	980
DNSW-315MB-06	90	990	160	94.8	0.86	DS 4	2.1	2.3	6.7	4.0	1050
DNSW-315MC-06	110	990	195	95.2	0.87	DS 4	2.3	2.3	7.0	4.9	1150
DNSW-315MD-06	132	990	229	95.3	0.87	DS 4	2.4	2.2	6.9	4.9	1150
DNSW-315LB-06	160	990	278	95.5	0.87	DS 4	2.4	2.3	7.0	6.0	1400

Higher outputs, other voltages and frequencies on request.  
Temperature classes T5 and T6 on request.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**400V – 50 Hz**  
Class F insulation, Utilization to B  
**Temperature class T4**

**Types: DNGW / DNSW      Number of poles: 8      – 50 Hz**

Type	Rated output	Rated speed	Rated current at	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
			400V				with direct-on starting as a multiple of the				
	kW	1/min	A	%	cos $\varphi$		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
							$M_A/M_N$	$M_K/M_N$	$I_A/I_N$		

### Speed 750 min<sup>-1</sup>

<b>DNGW-071BH-08</b>	0.12	655	0.51	50	0.68	HS 3	1.9	2.0	2.4	0.0009	15
<b>DNGW-080BH-08</b>	0.25	650	1.06	53	0.66	HS 3	1.7	1.9	2.3	0.0020	22
<b>DNGW-090LX-08</b>	0.37	680	1.38	63	0.62	HS 3	1.6	1.9	2.5	0.0036	30
<b>DNGW-090LD-08</b>	0.55	670	2.0	62	0.65	HS 3	1.6	1.9	2.5	0.0036	30
<b>DNGW-100LB-08</b>	0.75	700	2.3	69	0.71	HS 4	2.0	2.1	3.7	0.0086	35
<b>DNGW-100LD-08</b>	1.1	695	3.25	70	0.71	HS 4	1.7	2.0	3.5	0.0100	40
<b>DNGW-112MB-08</b>	1.5	700	4.2	75	0.71	HS 3	1.8	2.0	3.7	0.0136	55
<b>DNGW-132SL-08</b>	2.2	715	5.6	82	0.70	HS 4	2.0	2.3	4.4	0.033	85
<b>DNGW-132ML-08</b>	3.0	715	7.4	84	0.70	HS 4	2.0	2.2	4.3	0.045	95
<b>DNGW-160ML-08</b>	4.0	715	9.0	84	0.76	HS 4	1.7	2.1	4.4	0.092	150
<b>DNGW-160MN-08</b>	5.5	720	12.4	85	0.75	HS 4	1.8	2.4	5.3	0.12	155
<b>DNGW-160LL-08</b>	7.5	720	17.3	86	0.74	HS 4	2.1	2.4	5.4	0.16	180
<b>DNGW-180LB-08</b>	11.0	715	23.3	87.5	0.78	HS 4	1.8	2.6	5.0	0.19	210
<b>DNGW-200LB-08</b>	15.0	720	32.5	89	0.76	HS 4	1.8	2.1	4.0	0.33	320
<b>DNGW-225SB-08</b>	18.5	725	39	89.5	0.77	HS 4	2.4	2.4	5.0	0.46	350
<b>DNGW-225MB-08</b>	22	730	48	90.5	0.73	HS 5	3.0	3.0	5.1	0.55	385
<b>DNGW-250MB-08</b>	30	735	58	91.5	0.80	HS 4	1.9	2.2	5.3	1.0	510
<b>DNGW-280SG-08</b>	37	735	72	92	0.80	DS 4	1.8	2.2	5.0	1.9	750
<b>DNGW-280MG-08</b>	45	740	90	92.5	0.80	DS 4	2.2	2.1	5.0	2.2	800
<b>DNSW-315SB-08</b>	55	740	110	94.4	0.78	DS 4	1.6	2.1	6.0	3.3	980
<b>DNSW-315MB-08</b>	75	740	146	94.4	0.79	DS 4	1.6	2.0	5.8	4.0	1050
<b>DNSW-315MC-08</b>	90	740	175	94.4	0.79	DS 4	1.7	2.5	5.8	4.8	1150
<b>DNSW-315MD-08</b>	110	740	216	94.4	0.79	DS 4	1.7	2.0	5.8	4.8	1150
<b>DNSW-315LB-08</b>	132	740	255	94.5	0.79	DS 4	1.6	2.0	5.8	6.0	1250

Higher outputs, other voltages and frequencies on request.  
Temperature classes T5 and T6 on request.

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**380–420V – 50 Hz**  
 Class F insulation, Utilization to B  
**Temperature class T4**

**Types: DNGW / DNSW    Number of poles: 2    – Wide voltage range**

Type	Rated output	Rated speed	Rated current at 380 to 420V	Efficiency $\eta$	Power factor $\cos \varphi$	Rotor class	Starting torque  with direct-on starting as a multiple of the rated torque	Breakd. torque rated torque	Starting current rated current	Moment of inertia J	Net weight
	kW	1/min	A	%			$M_A/M_N$	$M_K/M_N$	$I_A/I_N$	kg m <sup>2</sup>	approx. kg
<b>Speed 3000 min<sup>-1</sup></b>											
DNGW-071BG-02	0.37	2770	1.05	66	0.83	HS 5	2.6	2.7	4.6	0.0003	12
DNGW-071BH-02	0.55	2765	1.4	69	0.86	HS 5	2.5	2.7	4.6	0.0004	13
DNGW-080BG-02	0.75	2820	1.86	76	0.83	HS 5	2.9	2.9	5.6	0.0006	20
DNGW-080BH-02	1.1	2800	2.60	77	0.84	HS 5	3.1	3.0	5.3	0.0008	22
DNGW-090LX-02	1.5	2835	3.3	78.4	0.88	HS 5	2.5	2.7	5.7	0.0020	32
DNGW-090LD-02	2.2	2850	4.7	81.3	0.88	HS 5	2.9	3.0	6.3	0.0020	32
DNGW-100LB-02	3.0	2880	6.3	84.2	0.88	HS 5	2.7	3.0	6.7	0.0039	37
DNGW-112MB-02	4.0	2880	7.8	85.5	0.92	HS 5	2.9	3.5	6.9	0.0060	55
DNGW-132SL-02	5.5	2900	10.9	86.5	0.88	HS 5	3.0	3.3	6.5	0.0110	85
DNGW-132SN-02	7.5	2910	14.6	88	0.88	HS 5	3.4	3.8	7.3	0.0140	90
DNGW-160ML-02	11	2920	22	88.5	0.87	HS 5	2.7	2.9	5.7	0.0364	150
DNGW-160MN-02	15	2920	29	90	0.89	HS 5	2.7	3.0	5.8	0.045	155
DNGW-160LL-02	18.5	2920	34.5	91	0.90	HS 5	2.9	3.0	6.1	0.057	170
DNGW-180MB-02	22	2950	42	91	0.87	HS 5	2.2	3.0	6.9	0.094	190
DNGW-200LB-02	30	2960	54	92.5	0.91	HS 4	2.4	2.6	7.1	0.182	310
DNGW-200LD-02	37	2955	67	93	0.90	HS 4	2.6	2.8	7.3	0.20	325
DNGW-225MB-02	45	2965	82	93.5	0.89	HS 5	2.2	2.7	6.8	0.247	375
DNGW-250MB-02	55	2975	101	94.1	0.86	HS 5	2.3	3.2	7.3	0.45	500
DNGW-280SG-02	75	2980	134	94.7	0.89	HS 4	2.2	2.2	6.6	0.88	725
DNGW-280MG-02	90	2975	160	95	0.90	HS 4	2.0	2.2	6.3	1.03	775
DNSW-315SB-02	110	2975	198	95	0.89	DS 4	2.0	2.4	6.3	1.61	950
DNSW-315MB-02	132	2980	240	95.5	0.89	DS 4	2.0	2.4	6.1	1.91	1030
DNSW-315MD-02	160	2980	285	95.8	0.89	DS 4	2.3	2.6	6.5	2.3	1100
DNSW-315LB-02	200	2980	355	96	0.90	DS 4	2.5	2.7	6.5	2.8	1350

Higher outputs, other voltages and frequencies on request.  
 Temperature classes T5 and T6 on request.

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**380–420V – 50 Hz**  
 Class F insulation, Utilization to B  
**Temperature class T4**

**Types: DNGW / DNSW    Number of poles: 4    – Wide voltage range**

Type	Rated output	Rated speed	Rated current at 380 to 420V	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J	Net weight
	kW	1/min	A	%	$\cos \varphi$		$M_A/M_N$	$M_K/M_N$	$I_A/I_N$	kg m <sup>2</sup>	approx. kg
<b>Speed 1500 min<sup>-1</sup></b>											
<b>DNGW-071BG-04</b>	0.25	1350	0.78	60	0.78	HS 4	2.4	2.4	3.6	0.0007	12
<b>DNGW-071BH-04</b>	0.37	1360	1.11	65	0.77	HS 5	2.5	2.5	3.6	0.0009	13
<b>DNGW-080BG-04</b>	0.55	1400	1.60	70	0.77	HS 4	2.1	2.3	3.8	0.0015	20
<b>DNGW-080BH-04</b>	0.75	1380	2.05	73	0.79	HS 4	2.0	2.1	3.6	0.0020	22
<b>DNGW-090LX-04</b>	1.1	1400	2.75	77	0.83	HS 4	2.1	2.3	4.9	0.0036	32
<b>DNGW-090LD-04</b>	1.5	1410	3.45	79	0.83	HS 5	2.5	2.7	5.0	0.0036	32
<b>DNGW-100LB-04</b>	2.2	1400	4.95	81	0.84	HS 5	2.2	2.5	5.1	0.0051	37
<b>DNGW-100LD-04</b>	3.0	1410	6.7	82.6	0.82	HS 5	2.5	2.7	5.7	0.0066	40
<b>DNGW-112MB-04</b>	4.0	1415	8.6	84	0.84	HS 5	2.2	2.6	5.7	0.012	57
<b>DNGW-132SL-04</b>	5.5	1440	11	87	0.85	HS 5	2.3	2.7	6.4	0.022	85
<b>DNGW-132ML-04</b>	7.5	1445	15.3	88	0.85	HS 5	2.6	3.0	7.1	0.030	100
<b>DNGW-160ML-04</b>	11	1460	21.5	90	0.84	HS 5	2.5	2.4	6.0	0.068	150
<b>DNGW-160LL-04</b>	15	1455	31.5	90.7	0.85	HS 4	2.9	2.3	5.7	0.092	180
<b>DNGW-180MB-04</b>	18.5	1465	36	91.3	0.86	DS 5	2.9	2.6	6.5	0.13	190
<b>DNGW-180LB-04</b>	22	1465	42	91.9	0.86	DS 5	2.9	2.5	6.5	0.16	210
<b>DNGW-200LB-04</b>	30	1465	57	92.5	0.87	HS 4	2.4	2.2	6.2	0.25	310
<b>DNGW-225SB-04</b>	37	1470	70	93	0.87	HS 4	2.2	2.2	6.1	0.35	360
<b>DNGW-225MB-04</b>	45	1475	86	93.2	0.84	HS 5	2.6	2.5	6.5	0.41	400
<b>DNGW-250MB-04</b>	55	1480	100	94.5	0.88	HS 5	2.4	2.9	7.4	0.80	510
<b>DNGW-280SG-04</b>	75	1480	139	94.7	0.88	HS 4	2.2	2.5	6.2	1.44	750
<b>DNGW-280MG-04</b>	90	1480	165	95	0.88	HS 4	2.3	2.5	6.2	1.65	800
<b>DNSW-315SB-04</b>	110	1485	205	95.2	0.85	DS 4	2.1	2.3	6.3	2.4	980
<b>DNSW-315MB-04</b>	132	1485	250	95.5	0.85	DS 4	2.1	2.3	6.2	2.9	1050
<b>DNSW-315MD-04</b>	160	1485	300	95.6	0.86	DS 4	2.1	2.2	6.2	3.4	1120
<b>DNSW-315LB-04</b>	200	1485	370	95.7	0.85	DS 4	2.5	2.5	6.3	4.0	1350

Higher outputs, other voltages and frequencies on request.  
 Temperature classes T5 and T6 on request.



**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**380–420 V – 50 Hz**  
 Class F insulation, Utilization to B  
**Temperature class T4**

**Types: DNGW / DNSW    Number of poles: 6    – Wide voltage range**

Type	Rated output	Rated speed	Rated current at 380 to 420V	Efficiency $\eta$	Power factor $\cos \varphi$	Rotor class	Starting torque  rated torque $M_A/M_N$	Breakd. torque with direct-on starting as a multiple of the rated torque $M_K/M_N$	Starting current rated current $I_A/I_N$	Moment of inertia J  kg m <sup>2</sup>	Net weight  approx. kg
	kW	1/min	A	%							
<b>Speed 1000 min<sup>-1</sup></b>											
DNGW-071BH-06	0.25	870	0.89	59	0.71	HS 4	2.0	1.8	2.6	0.0009	15
DNGW-080BG-06	0.37	895	1.30	64	0.71	HS 4	2.0	2.1	3.1	0.0015	20
DNGW-080BH-06	0.55	850	1.75	65	0.72	HS 4	2.0	2.1	3.1	0.0020	22
DNGW-090LX-06	0.75	900	2.3	68.3	0.76	HS 4	1.6	1.9	3.1	0.0036	30
DNGW-090LD-06	1.1	915	3.5	72	0.72	HS 4	2.0	2.3	3.1	0.0036	30
DNGW-100LB-06	1.5	940	4.4	76.4	0.70	HS 4	2.2	2.5	4.2	0.0086	40
DNGW-112MB-06	2.2	940	5.4	80	0.77	HS 3	1.7	2.0	4.1	0.014	60
DNGW-132SL-06	3.0	955	6.6	85.6	0.81	HS 4	2.2	2.7	5.7	0.030	85
DNGW-132ML-06	4.0	955	9.1	84.7	0.81	HS 4	2.3	2.6	5.3	0.033	90
DNGW-132MN-06	5.5	955	12.2	86	0.82	HS 5	2.6	2.6	5.8	0.045	95
DNGW-160ML-06	7.5	970	16.3	87.9	0.81	HS 5	2.4	2.8	6.9	0.100	150
DNGW-160LL-06	11	965	23	88.8	0.82	HS 5	2.4	2.8	6.3	0.134	180
DNGW-180LB-06	15	965	31	90	0.80	HS 4	1.6	2.6	5.4	0.13	210
DNGW-200LB-06	18.5	970	38	90.8	0.83	DS 4	2.2	2.0	4.8	0.33	320
DNGW-200LD-06	22	965	47	90.9	0.81	DS 4	2.3	2.0	4.7	0.33	330
DNGW-225MB-06	30	975	60	91.8	0.83	DS 5	2.6	2.3	5.6	0.55	385
DNGW-250MB-06	37	985	76	92.5	0.80	DS 4	2.3	2.2	6.3	1.00	510
DNGW-280SG-06	45	985	86	93.3	0.87	DS 4	2.1	2.1	5.8	1.87	750
DNGW-280MG-06	55	985	105	93.4	0.86	DS 4	2.1	2.4	5.9	2.3	800
DNSW-315SB-06	75	990	142	94.6	0.85	DS 4	2.2	2.3	6.3	3.3	980
DNSW-315MB-06	90	990	170	94.8	0.86	DS 4	2.1	2.3	6.3	4.0	1050
DNSW-315MC-06	110	990	200	95.2	0.87	DS 4	2.3	2.3	6.8	4.9	1150
DNSW-315MD-06	132	990	240	95.3	0.87	DS 4	2.4	2.2	6.6	4.9	1150
DNSW-315LB-06	160	990	290	95.5	0.87	DS 4	2.4	2.3	6.7	6.0	1400

Higher outputs, other voltages and frequencies on request.  
 Temperature classes T5 and T6 on request.

## Series DN..., Output tables

### Three-phase motors with squirrel cage

Totally enclosed fan-cooled, enclosure IP 55

Protection type "Flameproof Enclosure" EEx de IIC

Types: DNGW / DNSW Number of poles: 2 – 60 Hz

440V – 60 Hz

Class F insulation, Utilization to B

Temperature class T4

Type	Rated output	Rated speed	Rated current at	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque with direct-on starting as a multiple of the	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	440V A	%	cos $\varphi$		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 3600 min<sup>-1</sup></b>											
DNGW-071BH-02	0.66	3310	1.46	70.0	0.88	HS 5	2.6	2.7	4.6	0.0004	13
DNGW-080BH-02	1.35	3380	2.65	79.0	0.85	HS 5	3.1	3.1	5.7	0.0008	22
DNGW-090LX-02	1.8	3415	3.3	81.0	0.90	HS 5	2.7	2.8	7.0	0.0020	32
DNGW-090LD-02	2.6	3440	4.85	82.0	0.87	HS 5	3.1	3.2	6.9	0.0020	32
DNGW-100LB-02	3.6	3465	6.5	85.0	0.88	HS 5	2.8	3.1	7.1	0.0039	37
DNGW-112MB-02	4.8	3480	8.2	85.5	0.91	HS 5	3.0	3.6	7.3	0.0060	55
DNGW-132SL-02	6.5	3500	11.8	85.5	0.87	HS 5	3.0	3.2	6.7	0.0110	85
DNGW-132SN-02	8.6	3490	14.4	88.0	0.89	HS 5	2.9	3.4	7.0	0.0140	90
DNGW-160ML-02	13.2	3520	22	90.5	0.88	HS 5	2.5	2.9	6.2	0.0364	150
DNGW-160MN-02	18	3520	30.5	90.5	0.87	HS 5	3.0	3.1	6.3	0.045	155
DNGW-160LL-02	22	3520	35.5	91.2	0.89	HS 5	2.9	2.9	6.8	0.057	170
DNGW-180MB-02	26	3550	46.5	91.2	0.86	HS 5	2.1	2.8	6.8	0.094	190
DNGW-200LB-02	36	3555	56	93.0	0.91	HS 5	2.4	2.7	6.8	0.182	310
DNGW-200LD-02	44	3560	69	94.0	0.89	HS 5	2.5	2.8	7.5	0.200	325
DNGW-225MB-02	54	3560	86	94.0	0.88	HS 5	2.2	2.6	7.1	0.247	375
DNGW-250MB-02	65	3570	105	94.0	0.86	HS 5	2.3	3.1	7.1	0.45	500
DNGW-280SG-02	86	3575	138	94.7	0.87	HS 4	2.1	2.1	6.5	0.88	725
DNGW-280MG-02	110	3570	163	95.0	0.88	HS 4	2.0	2.3	6.5	1.03	775
DNSW-315SB-02	120	3580	191	95.0	0.88	DS 4	1.9	2.5	6.5	1.61	950
DNSW-315MB-02*	143	3575	220	95.8	0.89	DS 4	2.0	2.4	6.4	1.91	1030
DNSW-315MD-02	185	3580	285	95.8	0.89	DS 4	2.4	2.6	6.9	2.3	1100
DNSW-315LB-02*	220	3580	335	96.0	0.89	DS 4	2.5	2.7	7.1	2.8	1350

Higher outputs, other voltages and frequencies on request.

Temperature classes T5 and T6 on request.

\* Utilization to insulation class F.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**440V – 60 Hz**  
Class F insulation, Utilization to B  
**Temperature class T 4**

**Types: DNGW / DNSW      Number of poles: 4      – 60 Hz**

Type	Rated output	Rated speed	Rated current at	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque with direct-on starting as a multiple of the	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	440V A	%	cos $\varphi$		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 1800 min<sup>-1</sup></b>											
DNGW-071BH-04	0.44	1650	1.11	67.0	0.79	HS 5	2.4	2.4	3.9	0.0009	13
DNGW-080BH-04	0.90	1670	2.10	73.5	0.80	HS 4	2.0	2.1	3.9	0.0020	22
DNGW-090LX-04	1.5	1685	3.00	79.0	0.84	HS 4	2.2	2.4	5.0	0.0036	32
DNGW-090LD-04	1.8	1710	3.65	80.0	0.82	HS 4	2.2	2.3	5.1	0.0036	32
DNGW-100LB-04	2.6	1700	5.3	81.5	0.84	HS 5	2.2	2.4	5.3	0.0051	37
DNGW-100LD-04	3.4	1700	6.6	82.6	0.84	HS 5	2.6	2.7	5.8	0.0066	40
DNGW-112MB-04	4.8	1720	8.8	85.0	0.84	HS 5	2.3	2.6	5.9	0.012	57
DNGW-132SL-04	6.6	1740	11.4	88.0	0.86	HS 5	2.2	2.6	6.8	0.022	85
DNGW-132ML-04	8.6	1735	15.0	88.5	0.85	HS 5	2.2	2.5	6.9	0.030	100
DNGW-160ML-04	13.2	1760	23.0	91.0	0.84	HS 5	2.6	2.5	6.2	0.068	150
DNGW-160LL-04	17	1750	29.5	91.2	0.84	HS 5	2.9	2.4	6.3	0.092	180
DNGW-180MB-04	22	1765	36.6	92.0	0.87	DS 5	2.9	2.4	6.3	0.13	190
DNGW-180LB-04	25	1765	41.5	92.0	0.86	DS 5	2.9	2.5	6.3	0.16	210
DNGW-200LB-04	36	1765	60	92.9	0.86	HS 5	2.5	2.4	6.4	0.25	310
DNGW-225SB-04	43	1770	73	93.2	0.84	HS 5	2.3	2.5	5.9	0.35	360
DNGW-225MB-04	52	1770	90	93.9	0.83	HS 5	2.8	2.7	6.8	0.41	400
DNGW-250MB-04	63	1780	103	94.5	0.85	HS 5	2.3	2.6	7.2	0.80	510
DNGW-280SG-04	85	1780	138	94.8	0.85	HS 5	2.3	2.6	6.6	1.44	750
DNGW-280MG-04	100	1780	161	95.0	0.87	HS 5	2.3	2.5	6.6	1.65	800
DNSW-315SB-04	126	1785	208	95.1	0.84	DS 4	2.2	2.3	6.5	2.4	980
DNSW-315MB-04	150	1785	245	95.5	0.85	DS 4	2.2	2.2	6.5	2.9	1050
DNSW-315MD-04	180	1785	290	95.5	0.85	DS 4	2.2	2.2	6.8	3.4	1120
DNSW-315LB-04	220	1785	360	95.8	0.84	DS 4	2.6	2.5	6.8	4.0	1350

Higher outputs, other voltages and frequencies on request.

Temperature classes T5 and T6 on request.

\* Utilization to insulation class F.

Type series D

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**440V – 60 Hz**  
Class F insulation, Utilization to B  
**Temperature class T 4**

**Types: DNGW / DNSW      Number of poles: 6      – 60 Hz**

Type	Rated output	Rated speed	Rated current at	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque with direct-on starting as a multiple of the	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	440V A	%	cos $\varphi$		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 1200 min<sup>-1</sup></b>											
DNGW-071BH-06	0.30	1100	0.92	63.0	0.69	HS 4	2.1	2.0	3.1	0.0009	15
DNGW-080BH-06	66	1090	1.90	67.0	0.69	HS 4	2.2	2.3	3.4	0.0020	22
DNGW-090LX-06	0.90	1095	2.3	69.0	0.75	HS 4	1.7	2.0	3.4	0.0026	28
DNGW-090LD-06	1.32	1100	3.4	73.5	0.74	HS 4	2.0	2.3	3.8	0.0036	30
DNGW-100LB-06	1.8	1140	4.5	78.0	0.74	HS 4	2.3	2.5	4.9	0.0086	40
DNGW-112MB-06	2.6	1150	5.8	83.0	0.73	HS 3	1.8	2.1	4.9	0.014	60
DNGW-132SL-06	3.6	1150	6.9	86.0	0.81	HS 4	2.1	2.6	6.0	0.030	85
DNGW-132ML-06	4.8	1150	9.3	85.0	0.81	HS 4	2.3	2.6	6.0	0.033	90
DNGW-132MN-06	6.6	1150	12.8	86.5	0.80	HS 5	2.6	2.6	6.0	0.045	95
DNGW-160ML-06	9.0	1165	16.6	88.5	0.81	HS 5	2.2	2.7	6.5	0.100	150
DNGW-160LL-06	13.2	1160	23.5	89.5	0.82	HS 5	2.3	2.6	6.9	0.134	180
DNGW-180LB-06	18.0	1165	34.0	91.0	0.79	HS 4	1.5	2.5	5.8	0.13	210
DNGW-200LB-06	22	1170	40.5	91.5	0.79	DS 4	2.4	2.2	5.3	0.33	320
DNGW-200LD-06	26	1170	48.5	91.6	0.79	DS 4	2.5	2.3	5.4	0.33	330
DNGW-225MB-06	36	1175	63	92.8	0.82	DS 4	2.4	2.1	5.9	0.55	385
DNGW-250MB-06	43	1185	77	93.2	0.80	DS 4	2.3	2.2	6.8	1.00	510
DNGW-280SG-06**	54	1185	89	93.0	0.86	DS 4	2.2	2.2	6.0	1.87	750
DNGW-280MG-06**	63	1185	103	93.5	0.86	DS 4	2.1	2.3	6.2	2.3	800
DNSW-315SB-06	85	1190	137	95.0	0.86	DS 4	2.1	2.2	6.7	3.3	980
DNSW-315MB-06	105	1190	168	95.4	0.85	DS 4	1.9	2.2	6.7	4.0	1050
DNSW-315MC-06	132	1190	207	95.6	0.87	DS 4	2.1	2.3	6.8	4.9	1150
DNSW-315MD-06	150	1190	235	95.8	0.87	DS 4	2.0	2.2	6.7	4.9	1150
DNSW-315LB-06	170	1190	265	95.8	0.87	DS 4	2.0	2.1	6.7	6.0	1400

Higher outputs, other voltages and frequencies on request.

Temperature classes T5 and T6 on request.

\*\* Larger laminated core possible, then higher output, on request.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**  
**Types: DNGW / DNSW      Number of poles: 4 / 2**

**400V – 50 Hz**  
Class F insulation, Utilization to B  
**Temperature class T4**

Type	Rated output	Rated speed	Rated current at 400V	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J	Net weight
	kW	1/min	A				kg m <sup>2</sup>	approx. kg
<b>Pole-changing for 2 speeds with 1 Dahlander-connected winding</b>					<b>Speed 1500/3000 min<sup>-1</sup></b>			
DNGW-080BH-42	0.65/0.85	1420/2880	1.9/2.0	HS 4	2.2/2.1	4.2/5.5	0.002	23
DNGW-090LD-42	1.45/1.9	1420/2860	3.7/4.3	HS 4	1.9/1.8	4.7/5.7	0.0036	32
DNGW-100LB-42	2/2.4	1410/2865	4.6/5.3	HS 4	1.9/2.0	4.8/5.8	0.005	37
DNGW-100LD-42	2.6/3.2	1420/2865	6.0/6.8	HS 5	2.2/2.2	5.0/5.8	0.0066	40
DNGW-112MB-42	3.6/4.3	1410/2880	7.8/8.7	HS 3	1.7/1.8	4.5/5.9	0.011	57
DNGW-132SL-42	4.9/6	1450/2910	10/12.2	HS 4	2.0/2.3	6.8/7	0.022	85
DNGW-132ML-42	6.5/9	1455/2920	13.1/17.2	HS 5	2.8/2.3	7.0/7.5	0.030	100
DNGW-160ML-42	9/11	1455/2920	17.8/21	HS 4/5	2.4/2.4	5.9/6.5	0.068	150
DNGW-160LL-42	13/16	1460/2930	26.5/31	HS 5	2.6/2.7	6.2/7.0	0.092	170
DNGW-180MB-42	16.5/20	1465/2940	31/37	HS 5	2.4/2.2	5.8/6.5	0.13	190
DNGW-180LB-42	18.5/25	1460/2940	34.5/45.5	HS 5	2.6/2.4	5.8/6.2	0.16	210
DNGW-200LB-42	26/31	1470/2960	48/56	HS 5	2.6/2.5	6.2/7.1	0.25	310
DNGW-225SB-42	32/38	1470/2960	59/71	HS 5	2.3/2.6	6.5/6.8	0.34	360
DNGW-225MB-42	38/46	1475/2960	71/86	HS 5	2.8/2.9	6.5/7.4	0.41	375
DNGW-250MB-42	45/55	1465/2945	86/97	HS 4	2.1/2.1	5/6.5	0.79	500
DNGW-280SG-42	60/75	1475/2965	110/125	HS 4	1.9/1.9	5.7/7.0	1.43	725
DNGW-280MG-42	73/90	1480/2970	130/150	HS 4	2.1/1.8	6.1/7.4	1.66	775
DNSW-315SB-42	82/96	1485/2980	152/163	HS 4	2.0/2.1	6.0/7.0	1.8	950
DNSW-315MB-42	100/124	1485/2975	181/202	HS 2/3	1.3/1.3	5.5/6.8	2.1	1030
DNSW-315MD-42	120/145	1485/2975	214/233	HS 2	1.3/1.3	5.5/6.8	2.5	1100
DNSW-315LB-42	142/172	1485/2975	253/276	HS 2	1.3/1.3	5.6/6.8	3.0	1200

Higher outputs, other voltages and frequencies on request.  
Temperature classes T5 and T6 on request.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**  
**Types: DNGW / DNSW      Number of poles: 6 / 4**

**400V – 50 Hz**  
Class F insulation, Utilization to B  
**Temperature class T4**

Type	Rated output	Rated speed	Rated current at 400V	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J	Net weight
	kW	1/min	A				kg m <sup>2</sup>	approx. kg
<b>Pole-changing for 2 speeds with 2 separate windings</b>					<b>Speed 1000/1500 min<sup>-1</sup></b>			
<b>DNGW-090LD-64</b>	0.6/0.9	940/1430	1.85/2.4	HS 3	1.8/1.8	4.0/4.5	0.004	32
<b>DNGW-100LB-64</b>	0.9/1.3	930/1420	2.6/3.1	HS 4/3	2.0/1.6	3.5/4.0	0.006	35
<b>DNGW-100LD-64</b>	1.1/1.5	930/1440	3.3/3.5	HS 3	1.8/1.7	3.5/4.4	0.007	40
<b>DNGW-112MB-64</b>	1.5/2.2	960/1455	4.1/4.8	HS 4	2.2/1.7	4.8/6.0	0.011	55
<b>DNGW-132SL-64</b>	2.2/3.3	965/1465	6.1/7.4	HS 4/5	1.9/1.9	5.5/7.0	0.024	85
<b>DNGW-132ML-64</b>	3/4.5	965/1460	7.5/9.5	HS 4	2.0/1.9	5.5/6.8	0.03	95
<b>DNGW-160ML-64</b>	4.5/6.5	965/1465	9.4/12.8	HS 4	1.9/1.9	6.0/7.3	0.068	150
<b>DNGW-160LL-64</b>	6.5/9.5	970/1465	13.5/17.8	HS 4	2.1/1.8	6.7/7.0	0.092	180
<b>DNGW-180LB-64</b>	11/16	970/1465	23/30	HS 3	1.9/1.6	6.0/6.8	0.13	210
<b>DNGW-200LB-64</b>	13/19	975/1470	26/35	DS 4	2.5/2.2	6.3/6.7	0.25	310
<b>DNGW-200LD-64</b>	15/23	975/1470	31/42	DS 5	2.9/2.4	6.6/6.9	0.25	330
<b>DNGW-225SB-64</b>	18/27	980/1475	42/51	DS 5/4	3.0/2.4	5.8/6.2	0.34	350
<b>DNGW-225MB-64</b>	21/31	980/1480	45/58	DS 5	2.9/2.4	5.7/6.2	0.41	400
<b>DNGW-250MB-64</b>	28/40	980/1480	55/73	HS 5/4	2.7/2.0	6.1/6.8	0.79	510
<b>DNGW-280SG-64</b>	43/65	985/1485	79/114	HS 4	2.0/1.9	6.6/7.1	1.7	750
<b>DNGW-280MG-64</b>	52/78	985/1485	95/135	HS 4	2.2/2.0	6.6/7.2	2.0	800
<b>DNSW-315SB-64*</b>	60/90	985/1485	120/160	DS 5/4	2.4/2.2	6.0/6.2	2.3	980
<b>DNSW-315MB-64*</b>	70/100	985/1485	135/179	HS 5	2.4/2.2	6.0/7.0	2.8	1050
<b>DNSW-315MD-64*</b>	80/115	985/1485	152/205	DS 5/4	2.4/2.2	6.0/7.0	3.3	1120
<b>DNSW-315LB-64*</b>	100/140	985/1485	195/245	DS 5/4	2.4/2.2	6.0/7.0	3.9	1200

Higher outputs, other voltages and frequencies on request.

Temperature classes T5 and T6 on request.

\* Utilization to insulation class F.

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**400V – 50 Hz**  
 Class F insulation, Utilization to B  
**Temperature class T4**

**Types: DNGW / DNSW      Number of poles: 8 / 4 and 8 / 6**

Type	Rated output	Rated speed	Rated current at 400V	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J	Net weight
	kW	1/min	A				kg m <sup>2</sup>	approx. kg

**Pole-changing for 2 speeds 1 Dahlander-connected winding**

**Speed 750/1500 min<sup>-1</sup>**

DNGW-090LD-84	0.5/0.8	685/1435	2/2	HS 3/4	1.5/1.9	2.3/4.4	0.0036	32
DNGW-100LB-84	0.9/1.3	700/1450	2.9/3.0	HS 3/4	1.6/2.1	3.3/4.9	0.0086	35
DNGW-100LD-84	1/1.6	705/1450	3.2/3.7	HS 3/4	1.7/1.9	3.5/5.8	0.010	40
DNGW-112MB-84	1.4/2.2	705/1425	4/4.8	HS 3	1.5/1.5	3.5/4.6	0.0136	55
DNGW-132SL-84	2.3/3.4	715/1445	5.6/7	HS 3	1.8/1.6	4.3/5.6	0.033	85
DNGW-132ML-84	3/5	725/1450	7.5/9.9	HS 4	2.4/2.0	5.1/6.4	0.045	95
DNGW-160ML-84	4/5.5	705/1430	9/11.1	HS 3	1.4/1.6	3.9/4.8	0.091	150
DNGW-160MN-84	5/7.5	715/1435	11/14.9	HS 4	1.8/1.8	4.7/5.3	0.12	155
DNGW-160LL-84	7/11	720/1440	16/22.3	HS 4	2.0/1.9	5.0/5.5	0.16	180
DNGW-180LB-84*	11/18	715/1440	24.5/33.5	HS 4	2.1/1.8	5.5/6.3	0.19	210
DNGW-200LB-84	17/25	715/1450	39/44.5	HS 4	2.4/2.4	4.2/5.9	0.33	310
DNGW-225SB-84*	22/31	725/1470	53/56	HS 5	3.0/2.9	4.8/5.4	0.46	360
DNGW-225MB-84*	26/38	725/1465	62/67	HS 5	3.1/2.9	5.1/7.3	0.55	400
DNGW-250MB-84	32/46	735/1480	71/82	HS 5	2.7/2.5	5.7/7.9	1.00	510
DNGW-280SG-84	42/60	735/1475	87/106	HS 4	2.0/2.0	4.1/5.7	2.26	750
DNGW-280MG-84	50/72	740/1480	101/124	HS 5	2.2/2.3	4.8/7.0	2.88	800
DNSW-315SB-84	60/83	742/1490	135/141	HS 4	1.9/1.9	5.2/7.7	3.40	980
DNSW-315MB-84	72/110	740/1490	156/183	HS 4	1.8/1.7	5.3/7.1	4.0	1050
DNSW-315MD-84	90/132	740/1485	195/223	HS 3/4	1.7/1.8	5.4/7.6	4.8	1120
DNSW-315LB-84*	115/160	740/1485	242/271	HS 3/4	1.6/1.9	5.2/8.0	6.0	1200

**Pole-changing for 2 speeds with 2 separate windings**

**Speed 750/1000 min<sup>-1</sup>**

DNGW-090LD-86	0.45/0.6	680/930	1.62/1.86	HS 3	1.4/1.3	2.5/3.0	0.0036	32
DNGW-100LB-86	0.6/0.8	715/965	2.4/2.6	HS 4	2.1/1.7	3.2/4.3	0.0086	35
DNGW-100LD-86	0.7/0.9	715/970	2.71/2.9	HS 4	1.9/2.0	3.2/4.2	0.010	40
DNGW-112MB-86	1.0/1.4	720/965	3.3/3.56	HS 4	2.1/1.7	3.7/4.4	0.0167	55
DNGW-132SL-86	1.5/2	715/970	4.65/5.9	HS 4	2.1/1.9	4.0/5.0	0.033	85
DNGW-132ML-86	2.2/3	720/965	6.80/7.9	HS 5	2.7/2.4	4.4/5.0	0.045	95
DNGW-160ML-86	4/5.5	720/970	9.1/11.7	HS 4	2.2/1.9	5.8/6.3	0.094	150
DNGW-160LL-86	5.5/7.5	720/975	12.7/17	HS 4	2.2/2.0	5.8/6.6	0.13	180
DNGW-180LB-86	8.5/11	725/975	18.5/22.3	HS 4/3	1.8/1.5	5.8/6.3	0.19	210
DNGW-200LB-86*	14.5/19	715/975	30.5/37.5	HS 4	2.1/2.1	4.1/5.5	0.33	320
DNGW-225SB-86	16/21	725/980	34.5/44.5	DS 5	2.7/2.9	4.7/6.6	0.46	350
DNGW-225MB-86	19/25	725/980	42/52	DS 5	2.3/2.5	4.5/5.8	0.55	400
DNGW-250MB-86	24/32	735/985	47.5/60	DS 4	2.2/1.8	5.8/6.4	1.00	510
DNGW-280SG-86	33/44	740/990	67/83	HS 4/3	1.9/1.6	4.7/5.2	1.73	750
DNGW-280MG-86	40/53	740/990	87/102	HS 5	2.3/1.8	5.4/5.6	2.06	800
DNSW-315SB-86*	50/65	740/990	102/121	DS 5/4	2.7/1.8	6.7/6.8	3.38	980
DNSW-315MB-86	60/80	740/990	115/147	DS 4	2.4/1.2	6.9/6.4	4.06	1050
DNSW-315MD-86*	70/95	735/985	135/167	DS 4	2.4/1.6	6.7/6.0	4.84	1150
DNSW-315LB-86	80/110	740/990	154/197	DS 5/4	2.6/1.6	6.7/6.0	6.0	1250

Temperature classes T5 and T6 on request.  
 \* Utilization to insulation class F.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**400V – 50 Hz**  
Class F insulation, Utilization to B  
**Temperature class T4**

**Types: DVGW / DVSW    Number of poles: 4 / 2    Fan design**

Type	Rated output	Rated speed	Rated current at 400V	Rotor class	Starting torque with direct-on starting as a multiple of the	Starting current as a multiple of the	Moment of inertia J	Net weight
	kW	1/min	A		rated torque	rated current	kg m <sup>2</sup>	approx. kg

**Pole-changing for 2 speeds with 1 Dahlander-connected winding,  
Design for fan drive**

**Speed 1500/3000 min<sup>-1</sup>**

DVGW-080BH-42	0.22/1.1	1425/2800	0.65/2.62	HS 4	2.2/1.7	4.0/5.0	0.002	23
DVGW-090LD-42	0.5/2	1445/2880	1.2/4.6	HS 4	2.4/2.2	5.8/6.4	0.0036	32
DVGW-100LB-42	0.65/2.4	1415/2860	1.5/5.3	HS 4	1.8/2.1	5.0/6.0	0.005	37
DVGW-100LD-42	0.8/3	1440/2870	1.8/6.9	HS 5	2.2/2.2	5.8/6.0	0.0066	40
DVGW-112MB-42	1.1/4.1	1440/2870	2.1/8.3	HS 4	1.7/2.1	5.3/6.2	0.011	57
DVGW-132SL-42	1.6/6	1455/2910	3.3/12	HS 4	2.0/2.1	6.0/6.8	0.022	85
DVGW-132ML-42	2.2/9	1450/2920	4.6/18.0	HS 5	2.3/2.3	6.8/7.3	0.03	100
DVGW-160ML-42	3/12	1460/2915	6/23.5	HS 4	2.0/2.1	5.0/6.0	0.068	150
DVGW-160LL-42	4/16	1470/2940	8.2/31	HS 5	2.7/2.9	6.5/7.3	0.092	170
DVGW-180MB-42	5.5/20	1470/2940	10.1/38	HS 5	2.3/2.3	6.0/7.0	0.13	190
DVGW-180LB-42*	6.3/25	1460/2940	12/46	DS 4	2.5/2.5	6.0/7.0	0.16	210
DVGW-200LB-42	8.5/33	1470/2960	16.2/61	DS 4	2.0/2.3	6.0/7.3	0.25	310
DVGW-225SB-42	10.5/38	1475/2960	20/71	HS 5	2.4/2.8	6.5/7.5	0.34	360
DVGW-225MB-42	13/46	1475/2965	24/85	HS 5	2.4/2.8	6.5/7.5	0.41	375
DVGW-250MB-42	15/55	1470/2950	29/97	HS 4/5	2.0/2.2	5.0/6.3	0.79	500
DVGW-280SG-42	20/75	1475/2965	36/125	HS 3/4	1.8/2.0	5.5/7.0	1.3	725
DVGW-280MG-42	24/90	1480/2970	44/149	HS 4	1.9/2.2	5.6/7.4	1.66	775
DVSW-315SB-42	27/110	1485/2980	48/179	HS 3	1.3/1.2	5.0/6.2	1.8	950
DVSW-315MB-42	33/132	1485/2980	59/215	HS 3	1.3/1.2	5.0/6.2	2.1	1030
DVSW-315MD-42	37/145	1485/2980	70/237	HS 3	1.2/1.2	5.2/6.8	2.5	1100
DVSW-315LB-42	44/172	1485/2980	78/276	HS 3	1.3/1.2	5.6/6.8	3.0	1200

Higher outputs, other voltages and frequencies on request.  
Temperature classes T5 and T6 on request.  
\* Utilization to insulation class F.



**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**400V – 50 Hz**  
Class F insulation, Utilization to B  
**Temperature class T4**

**Types: DVGW / DVSW    Number of poles: 6 / 4    Fan design**

Type	Rated output	Rated speed	Rated current at 400V	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Starting current with direct-on starting as a multiple of the rated current	Moment of inertia J	Net weight
	kW	1/min	A				kg m <sup>2</sup>	approx. kg

**Pole-changing for 2 speeds with 2 separate windings**  
**Design for fan drive**

**Speed 1000/1500 min<sup>-1</sup>**

DVGW-090LD-64	0.4/1.3	945/1410	1.4/3.3	HS 3/4	1.8/2.3	3.1/4.7	0.0036	32
DVGW-100LB-64	0.6/1.8	955/1425	1.95/4	HS 3/4	1.5/2.4	3.7/5.7	0.006	35
DVGW-100LD-64	0.75/2.4	940/1405	2.6/5.5	HS 3/4	1.5/2.2	3.2/5.1	0.007	40
DVGW-112MB-64	0.9/3	965/1455	2.3/7	HS 3/4	1.8/1.9	5.0/6.0	0.011	55
DVGW-132SL-64	1.25/4.2	965/1455	3/8.6	HS 3/4	1.4/2.2	5.0/6.0	0.024	85
DVGW-132ML-64	1.65/5.5	950/1440	3.9/11	HS 3/4	1.4/1.9	4.0/6.0	0.030	95
DVGW-160ML-64	2.2/7.5	985/1465	6.2/15.1	HS 4	2.2/2.2	5.1/6.0	0.068	150
DVGW-160MN-64	3/9	975/1465	8/18.0	HS 4	2.2/2.3	5.0/6.3	0.068	150
DVGW-160LL-64	3.5/12	980/1465	9.5/24	HS 5	2.3/2.6	5.5/6.8	0.092	180
DVGW-180MB-64	4.5/14	980/1465	10/27	HS 4	1.8/1.6	6.8/7.0	0.11	190
DVGW-180LB-64	5.5/16.5	975/1460	12/32	HS 4	1.8/1.6	6.8/7.0	0.13	210
DVGW-200LB-64	7/20	970/1465	14/35	HS 4	2.3/2.0	6.0/6.6	0.25	310
DVGW-200LD-64	9/26	975/1465	19/48	HS 5	2.5/2.5	6.0/7.0	0.25	330
DVGW-225SB-64	10/31	980/1475	22/59	DS 5	2.8/2.9	6.2/6.8	0.34	350
DVGW-225MB-64	13/38	980/1470	27/70	DS 4/5	2.3/2.7	5.5/7.0	0.41	400
DVGW-250MB-64	17/48	985/1480	34/87	HS 5	2.3/2.4	6.5/7.5	0.79	510
DVGW-280SG-64	25/70	985/1480	45/126	HS 4	1.9/1.7	6.5/7.0	1.7	750
DVGW-280MG-64	30/82	985/1485	55/141	HS 4	2.0/1.8	6.5/7.0	2.1	800
DVSW-315SB-64	32/95	985/1480	63/170	HS 4	2.4/2.0	6.0/6.0	2.3	980
DVSW-315MB-64	37/115	985/1480	70/200	DS 4	2.3/2.2	6.0/7.0	2.8	1050
DVSW-315MD-64	47/135	985/1485	88/233	DS 4	2.5/2.3	5.5/6.6	3.3	1120
DVSW-315LB-64	55/160	990/1485	105/280	DS 5	2.8/2.5	6.8/7.2	3.9	1200

Higher outputs, other voltages and frequencies on request.  
Temperature classes T5 and T6 on request.

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**400V – 50 Hz**  
 Class F insulation, Utilization to B  
**Temperature class T4**

**Types: DVGW / DVSW    Number of poles: 8 / 4    Fan design**

Type	Rated output	Rated speed	Rated current at 400V	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J	Net weight
	kW	1/min	A				kg m <sup>2</sup>	approx. kg

**Pole-changing for 2 speeds with 1 Dahlander-connected winding,  
 Design for fan drive**

**Speed 750/1500 min<sup>-1</sup>**

DVGW-080BH-84*	0.12/0.7	680/1400	7.6/2.0	HS 3	1.6/1.8	2.0/3.5	0.002	22
DVGW-090LD-84	0.35/1.3	705/1440	1.6/3.6	HS 3/4	1.8/2.2	2.8/4.9	0.0036	32
DVGW-100LB-84	0.45/2	705/1420	1.70/4.75	HS 3	1.6/1.8	2.8/4.6	0.005	35
DVGW-100LD-84	0.55/2.5	705/1415	2.1/5.8	HS 3	1.8/2.0	3.1/5.3	0.0066	40
DVGW-112MB-84	0.9/3.7	710/1430	3.20/8.6	HS 3/5	1.8/2.1	3.6/6.0	0.011	55
DVGW-132SL-84	1.3/5	720/1455	4/10.6	HS 3/5	1.7/2.3	4.0/7.0	0.022	85
DVGW-132ML-84	1.7/6.8	720/1460	5.3/14	HS 3/5	1.7/2.3	4.5/7.4	0.030	95
DVGW-160ML-84	3/10	725/1470	10/22	HS 4/5	1.9/2.7	3.3/6.6	0.068	150
DVGW-160LL-84	3.5/13	730/1460	10.5/26	HS 3/5	1.9/2.7	3.5/7.0	0.092	180
DVGW-180MB-84	4/16	735/1465	13/30	DS 4	1.9/2.4	4.5/6.1	0.13	190
DVGW-180LB-84	5.0/20	735/1455	13.5/39	DS 4/5	2.3/2.4	4.0/6.1	0.16	210
DVGW-200LB-84	7/28	720/1450	15/51	HS 4/5	2.1/2.5	4.4/6.4	0.33	310
DVGW-225SB-84	8/33	730/1465	17.5/59	DS 5	2.6/2.5	4.4/6.5	0.46	360
DVGW-225MB-84	9.5/39	730/1470	21/70	HS 4/5	2.7/3.0	4.8/7.0	0.55	400
DVGW-250MB-84	11/49	740/1480	23/86	HS 5	2.1/2.2	6.0/7.0	1.0	510
DVGW-280SG-84	17/68	740/1485	42/127	HS 4	1.8/2.1	4.3/7.5	1.3	750
DVGW-280MG-84	20/80	740/1485	48/140	HS 3/4	1.8/2.2	4.3/7.5	1.6	800
DVSW-315SB-84	22/95	735/1485	45/165	HS 3/5	1.4/1.8	4.6/7.0	3.4	980
DVSW-315MB-84*	26/115	740/1485	52/196	HS 3/4	1.4/1.8	4.6/7.0	4.0	1050
DVSW-315MD-84	30/132	740/1485	60/221	HS 3/4	1.5/1.9	4.7/7.0	4.8	1120
DVSW-315LB-84*	38/165	740/1490	74/276	HS 3/4	1.6/2.0	4.8/7.0	6	1200

Higher outputs, other voltages and frequencies on request.  
 Temperature classes T5 and T6 on request.  
 \* Utilization to insulation class F.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**400V – 50 Hz**  
Class F insulation, Utilization to B  
**Temperature class T4**

**Types: DVGW / DVSW    Number of poles: 8 / 6    Fan design**

Type	Rated output	Rated speed	Rated current at 400V	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J	Net weight
	kW	1/min	A				kg m <sup>2</sup>	approx. kg

**Pole-changing for 2 speeds with 2 separate windings**  
**Design for fan drive**

**Speed 750/1000 min<sup>-1</sup>**

DVGW-090LD-86	0.32/0.75	695/940	1.4/2.6	HS 3	1.7/1.7	2.4/3.2	0.0036	32
DVGW-100LB-86	0.45/1	720/960	1.8/3.0	HS 3	1.6/1.8	3.3/4.2	0.0086	35
DVGW-100LD-86	0.55/1.3	725/965	2.2/3.7	HS 3	1.6/2.0	3.3/4.5	0.01	40
DVGW-112MB-86	0.8/1.9	725/965	2.8/4.9	HS 3	1.7/2.0	3.5/4.9	0.017	55
DVGW-132SL-86	1.1/2.6	720/970	3.4/6.9	HS 3/4	1.4/2.2	3.8/5.6	0.033	85
DVGW-132ML-86	1.6/3.8	710/955	5/9.6	HS 5	2.5/2.6	4.0/5.6	0.045	95
DVGW-160ML-86	2.5/6	725/970	6.1/12.6	HS 4	2.3/1.9	5.9/6.2	0.094	150
DVGW-160LL-86	3.5/8	725/970	8.5/17	HS 4	2.0/1.8	5.6/6.2	0.127	180
DVGW-180LB-86	5.5/12.5	725/970	12.5/26	HS 3	1.7/1.7	5.0/6.0	0.19	210
DVGW-200LB-86	9.5/20	725/975	20/41	HS 4	2.1/2.6	4.5/6.0	0.33	320
DVGW-225SB-86	11/24	730/980	25/48	HS 4	2.1/2.5	4.7/6.2	0.46	350
DVGW-225MB-86	13/28	725/975	28/56	HS 4/5	2.2/2.5	4.5/6.0	0.55	400
DVGW-250MB-86	16/34	735/985	32/63	HS 3	1.8/1.7	5.5/6.3	1.00	510
DVGW-280SG-86	25/50	740/990	50/96	HS 4	2.1/1.9	5.5/6.1	1.70	750
DVGW-280MG-86	30/60	740/990	62/115	HS 4	2.2/1.9	5.6/6.1	2.06	800
DVSW-315SB-86	33/70	740/990	65/126	DS 4	2.5/1.6	6.7/6.2	3.38	980
DVSW-315MB-86	40/85	740/990	78/152	DS 4	2.6/1.6	6.8/6.7	4.06	1050
DVSW-315MD-86	47/100	740/990	90/180	DS 4	2.4/1.6	6.8/6.8	4.84	1150
DVSW-315LB-86	55/120	740/990	105/215	DS 4	2.4/1.6	6.8/6.8	6	1250

Higher outputs, other voltages and frequencies on request.  
Temperature classes T5 and T6 on request.  
\* Utilization to insulation class F.

## Series D..., Dimension drawings

Frame size – Number of poles  Compiled dimension drawings	Design	IM B3 IM V5 IM V6	IM B5 IM V1 IM V3	IM B35 IM V15 IM V36	IM B14 <sup>1</sup> IM V18 IM V19	IM B34 <sup>1</sup> IM V5/ IM V18 IM V6/ IM V19
071–132	Standard Noise grade 1				<b>MLD00-0026</b>	<b>MLD00-0027</b>
071–315		<b>MLD00-0023</b>	<b>MLD00-0024</b>	<b>MLD00-0025</b>		
132–315	Noise grade 3	<b>MLD00-0061</b>	<b>MLD00-0062</b>	<b>MLD00-0063</b>		
071–132	with cable entry (without terminal box)				<b>MLD00-0033</b>	
071–315		<b>MLD00-0031</b>	<b>MLD00-0032</b>			
112–315	Forced ventilation axially mounted	<b>MLD00-0034</b>	<b>MLD00-0035</b>	<b>MLD00-0036</b>		
071–315	Terminal box EEx e	<b>M 11833B</b>				
	Terminal box EEx d IIC	<b>M 11834A</b>				

<sup>1</sup> In accordance with DIN EN 50347 only the flanges up to the size FT 165 standardized

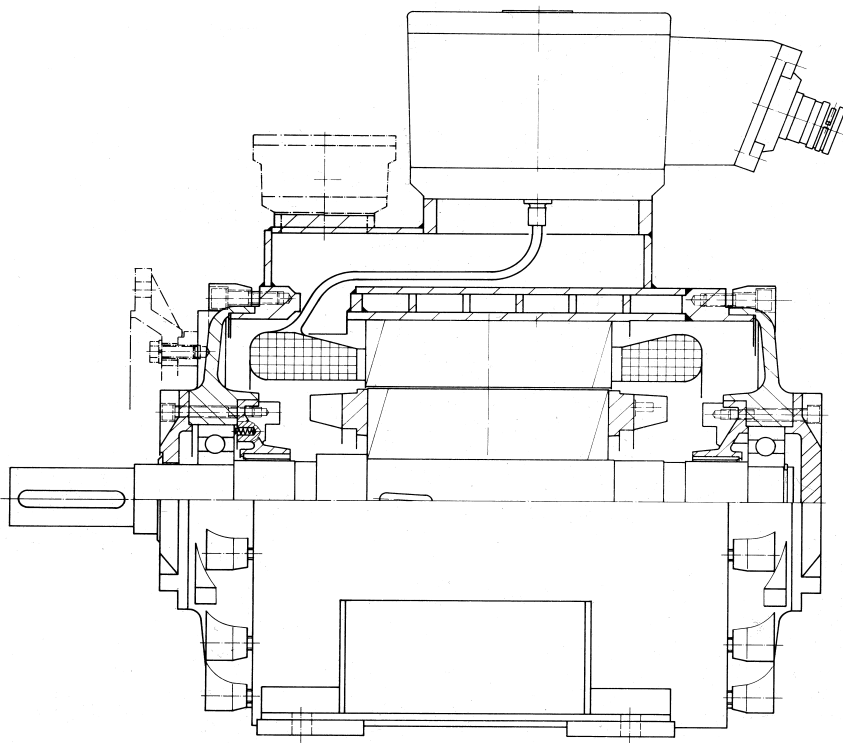
**The indicated dimension drawings are included in the Appendix of this technical list from Page 247 in ascending order.**

For the mounting types IM B3, IM B5 and IM B35 with terminal box on top the single dimension drawings are available in the output tables of the CD version (not in the printed version of this technical list).

# Water-cooled motors, Series DNWW

## Technical explanations

### Three-phase motor Type DNWW-280MG-04, Mounting IM B3



#### General notes

The advantages of water cooling are as follows:  
Reduction of the sound pressure level compared to totally enclosed fan-cooled three-phase motors of the same output and frame size. The heat of the motor is well dissipated and does not influence its direct surroundings. Smaller external dimensions. Higher outputs.

#### Design

The motor frame with its water chambers is steel welded. For water cooling the jacket of the frame is designed with a double wall. The cooling-water flow guarantees high-speed circulation and thus a uniform cooling. Bearings, terminal box, insulation of the stator winding, enclosure and painting are identical with the totally enclosed fan-cooled motors in this technical list.

#### Protection against condensed water

Motors of mounting types IM B3 and IM B5 are equipped inside the flameproof enclosure with separate cavities on the driving end and the non-driving end to collect possibly occurring condensed water. Damage to the winding due to the collection of water inside the winding-head areas is thus avoided. For extreme operating conditions, the sealing of both the terminal box and the winding-head areas with a silicon-rubber compound is recommended. (reference is also made to section "Design of stator winding").

#### Cleaning of the water chambers

Without dismantling the motor, the water chambers can be rinsed thoroughly and cleaned after opening of the cooling water supply and drain. The water chambers do not belong to the flameproof enclosure of the motor.

#### Motor protection

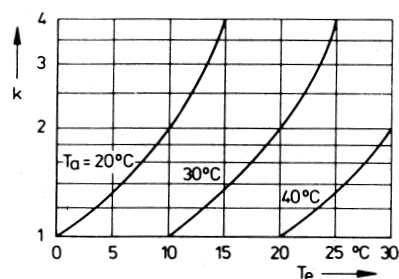
As additional protection a thermal motor protection by means of PTC-thermistors or flow controllers to monitor the cooling water have to be provided.

#### Output

The rated outputs and operating data given in the tables are valid for duty type S1 according to DIN EN 60034-1 at a rated frequency of 50 Hz and the rated voltage.

#### Cooling water requirement

The cooling water requirement as indicated in the tables is based on an inlet temperature of  $T_e = 20^\circ\text{C}$  and an outlet temperature of  $T_a \approx 40^\circ\text{C}$ . For other temperatures the quantity has to be multiplied by the factor  $k$  according to the diagram below, e.g.  $T_e = 20^\circ\text{C}$  and  $T_a = 30^\circ\text{C}$  result in a factor  $k = 2$ .



Cooling water inlet temperature min.  $20^\circ\text{C}$ .

The quality as well as the sediment of the cooling-water have to be stated in your order.

#### Special designs

Upon customer request water-cooled three-phase motors can be additionally equipped with: PTC thermistors for monitoring of the bearings, SPM detectors for vibration monitoring of the bearings, space heater, reverse lock or tachometer.

## Series DNWW, Output tables

### Three-phase brake motors with squirrel cage

Water-cooled, enclosure IP 55

Temperature class T4  
400V, 500V, 690V – 50 Hz  
Class F insulation

Types: DNWW

Number of poles: 2, 4, 6, 8

Type	Rated output	Rated speed	Rated current at 400V	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Cooling-water requirements <sup>1</sup>	Net weight
	kW	1/min	A	%	$\cos \varphi$		with direct-on starting as a multiple of the rated torque	with direct-on starting as a multiple of the rated torque	with direct-on starting as a multiple of the rated current	kg m <sup>2</sup>	approx. l/min	approx. kg

#### Speed 3000 min<sup>-1</sup>

DNWW-200LB-02	37	2940	64	91	0.92	HS 3	1.9	2.1	6.5	0.18	3.1	380
DNWW-200LD-02	45	2940	79	92	0.9	HS 4	2.1	2.3	6.6	0.20	3.3	400
DNWW-225MB-02	55	2950	95	92	0.9	HS 3	1.9	2.2	6.3	0.25	4.0	480
DNWW-250MB-02	75	2955	142	92.5	0.85	HS 3	1.8	2.5	6.3	0.45	4.9	650
DNWW-280SG-02	90	2965	160	93	0.87	HS 3	1.8	1.8	6.5	0.73	5.4	850
DNWW-280MG-02	110	2970	190	94.5	0.87	HS 3	1.9	1.9	6.8	0.90	5.2	950
DNWW-315SB-02	132	2975	223	95	0.89	DS 4	1.8	2.3	6.2	1.6	5.6	1050
DNWW-315MB-02	160	2975	273	95.2	0.89	DS 4	2.0	2.3	6.2	1.9	6.5	1150
DNWW-315MD-02	200	2975	340	95.5	0.89	DS 4	2.0	2.3	6.2	2.3	7.5	1200
DNWW-315LB-02	250	2980	423	95.8	0.89	DS 4	2.1	2.3	6.2	2.8	8.8	1350

#### Speed 1500 min<sup>-1</sup>

DNWW-200LB-04	37	1470	70	92	0.84	HS 4	2.4	2.0	6.3	0.25	2.8	380
DNWW-225SB-04	45	1475	85	92	0.83	HS 5	2.6	2.4	6.3	0.35	3.3	430
DNWW-225MB-04	55	1470	100	92.5	0.86	HS 4	2.3	2.1	6.2	0.40	3.8	480
DNWW-250MB-04	75	1475	135	93.0	0.86	HS 4	1.9	2.4	6.3	0.80	4.5	650
DNWW-280SG-04	90	1480	165	93.5	0.84	HS 4	2.0	1.9	7.0	1.2	5.0	850
DNWW-280MG-04	110	1480	200	94	0.84	HS 4	2.0	2.0	7.0	1.42	5.6	950
DNWW-315SB-04	132	1475	237	95	0.85	DS 4	1.8	2.0	6.2	2.4	6.2	1050
DNWW-315MB-04	160	1480	285	95	0.85	DS 4	1.8	2.0	6.2	2.9	7.0	1150
DNWW-315MD-04	200	1480	350	95.5	0.85	DS 4	2.0	2.3	6.2	3.5	8.4	1200
DNWW-315LB-04	250	1485	437	95.6	0.86	DS 4	2.2	2.1	6.2	4.0	8.4	1350

#### Speed 1000 min<sup>-1</sup>

DNWW-200LB-06	22	970	42	89.5	0.84	DS 4	2.3	2.0	5.2	0.30	2.1	380
DNWW-200LD-06	30	960	61	88	0.82	DS 4	1.9	1.7	4.5	0.30	3.3	400
DNWW-225MB-06	37	980	74	91	0.81	DS 4	2.5	2.1	5.7	0.55	3.0	480
DNWW-250MB-06	45	980	89	91.5	0.8	DS 4	2.1	2.1	6.7	1.0	3.4	650
DNWW-280SG-06	55	980	99	92.5	0.87	DS 4	2.1	2.0	6.3	1.9	3.6	850
DNWW-280MG-06	75	980	130	93	0.87	DS 4	2.1	2.0	6.4	2.3	4.5	950
DNWW-315SB-06	90	980	160	94.4	0.85	DS 4	2.0	2.1	6.0	3.3	4.5	1050
DNWW-315MB-06	110	980	200	95	0.85	DS 4	1.8	2.1	6.2	4	5.3	1150
DNWW-315MC-06	132	985	237	95.1	0.85	DS 4	1.9	2.2	6.0	4.8	6.2	1200
DNWW-315MD-06	160	985	290	95.2	0.85	DS 4	2.0	2.2	6.0	4.8	7.5	1200
DNWW-315LB-06	200	990	355	95.2	0.85	DS 4	2.1	2.2	6.0	6	8.1	1350

#### Speed 750 min<sup>-1</sup>

DNWW-200LB-08	18.5	715	38.5	86.5	0.81	DS 4	1.9	1.7	4.2	0.33	2.3	380
DNWW-225SB-08	22	720	46	87	0.78	DS 4	2.1	1.9	4.2	0.46	2.6	430
DNWW-225MB-08	30	725	62	88.5	0.75	DS 4	2.0	1.8	4.0	0.55	3.1	480
DNWW-250MB-08	37	725	77	89	0.78	DS 4	2.1	1.9	4.3	1.0	3.7	650
DNWW-280SG-08	45	730	90	92	0.8	DS 4	2.0	1.8	5.3	1.9	3.2	850
DNWW-280MG-08	55	735	108	92	0.8	DS 4	2.1	1.9	5.3	2.2	3.8	950
DNWW-315SB-08	75	735	142	94	0.80	DS 4	1.6	2.0	5.8	3.3	4.5	1050
DNWW-315MB-08	90	735	171	94	0.80	DS 4	1.5	2.0	5.8	4.0	5.3	1150
DNWW-315MC-08	110	730	204	94.2	0.80	DS 4	1.5	1.95	5.5	4.8	5.9	1200
DNWW-315MD-08	132	730	244	94.4	0.80	DS 4	1.5	1.95	5.5	4.8	6.7	1200
DNWW-315LB-08	160	730	295	94.5	0.80	DS 4	1.5	1.95	5.5	6.0	8.2	1350

Higher outputs, other voltages, frequencies and other output assignments to the frame sizes on request.

Temperature classes T5 and T6 on request.

<sup>1</sup> Cooling-water inlet temperature  $T_e = 20^\circ\text{C}$ .

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## Series DNWW, Dimension drawings

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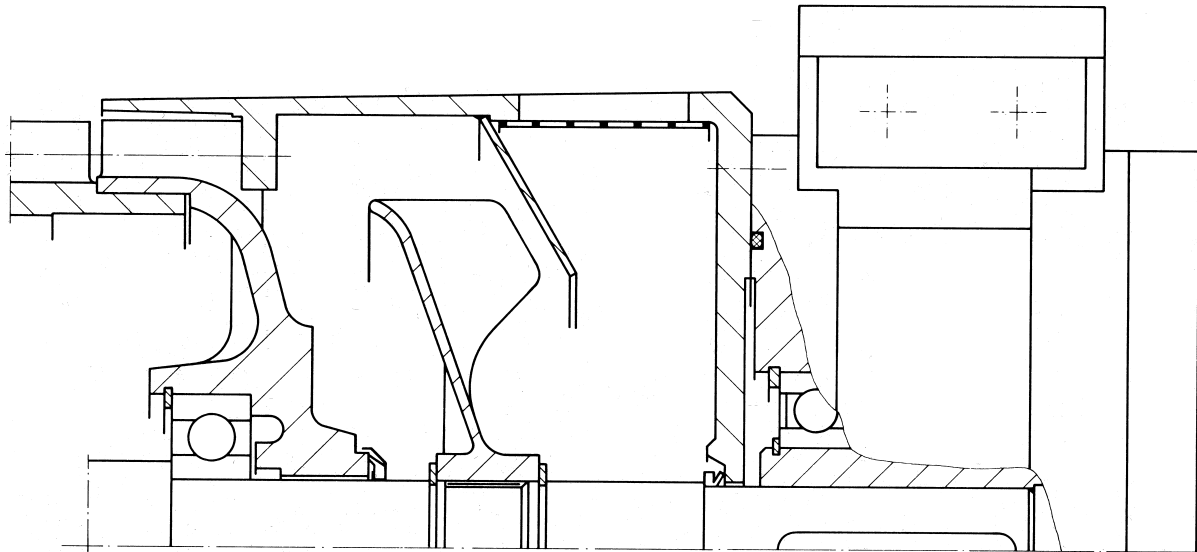
Frame size	IM B3, IM V5, IM V6	IM B5, IM V1, IM V3
	Terminal box on top	Terminal box on top
200–315	<b>MLD00-0037</b>	<b>MLD00-0038</b>

The indicated dimension drawings are included in the Appendix of this technical list from Page 247 in ascending order.

# Brake motors, Series DB..

## Technical explanations

### Mounted spring-loaded single-disk brake



#### Design

The explosion-proof spring-loaded single-disk brake is fixed at the reinforced fan cowl and at the extended motor shaft. All other structural characteristics are the same as for the TEFC motor types in this technical list.

#### Voltage and frequency

The motors with mounted brake are delivered with a voltage and frequency as stated in the output tables.

#### Output

The outputs stated in our tables refer to duty type S4 according to DIN EN 60034-1.

#### Thermal motor protection

Three PTC thermistors are installed in a motor and are provided for sole motor protection in combination with a monitoring device, e.g. a Loher CALOMAT<sup>®1</sup>.

#### Connection

The brake is connected to the terminal box mounted on the brake.

#### Brake

Type 762 ...10 ... 24 B  
Enclosure to DIN EN 60034-5:  
IP 56  
Protection type to EN 50014,  
EN 50018 and EN 50019  
Device: EEx d IIC T5  
Terminal box: EEx e II T5  
A.C. connection:  
Preferred voltage 230V 1 ~  
Frequency 40 ... 60 Hz  
or  
D.C. connection:  
Preferred voltages  
24V–, 205V–.

The spring-loaded single-disk brake is an electro-magnetic device for dry run utilizing the mechanical effect of an electro-magnetic field for the release of the brake efficiency caused by the resilience. The spring-loaded brake

works in unconnected and is released in connected condition.

The brake is available for connection to alternating and direct current.

It is also fitted with a microswitch and 2 thermal switches. These switching elements are designed for 250V, 1.6 amps inductive. A microswitch in the control wiring of the motor contactor prevents starting of the motor with the brake engaged. The microswitch is not allowed to be used for lifting devices and elevators. The thermal switches in line with the microswitch disconnect the current circuit as soon as the brake has reached a non-permissible temperature rise. The motor may only be controlled via the microswitch of the spring-loaded brake, so that it can never start at closed brake. On request the brake can be equipped with a manual release, allowing a manual release of the brake.

<sup>1</sup> If the motor is ordered and operated only in the duty type S1 and the mounted brake only as a holding brake, the motor can be protected by a motor protection switch according to DIN VDE 0165.

<sup>®</sup> = Registered trademark of the Loher GmbH



## Series DBGW, Output tables

**Three-phase motors with squirrel cage, with mounted brake**  
TEFC, enclosure IP 55  
Protection type "Flameproof Enclosure" EEx de II C

Temperature class T4  
400V, 500V, 690V – 50 Hz  
Class F insulation

**Types: DBGW**

**Number of poles: 4, 6, 8**

Preferred rated brake voltage:  
230V 1 ~, 50 Hz

Type	Rated output	Moment of inertia J motor + brake	Brake size	Braking torque	Conversion factor "c/h · J" <sup>1</sup> depending on starting period		
	kW	kg m <sup>2</sup>		Nm	S4 25% = C.D.F.	S4 40% C.D.F.	S4 60% C.D.F.
Speed 1500 min <sup>-1</sup>							
DBGW-080BH-04	0.75	0.00175	10	10	2.3	2.2	2
DBGW-090LX-04	1.1	0.00325	10	10	2.5	2	1.25
DBGW-090LD-04	1.5	0.00325	11	20	3.75	3	2
DBGW-100LB-04	2.2	0.00475	11	20	7.5	6.25	3.75
DBGW-100LD-04	3.0	0.00764	13	50	10	7.5	5
DBGW-112MB-04	4.0	0.0123	13	50	10	7.5	5
DBGW-132SL-04	5.5	0.0231	13	50	12.5	10	6.25
DBGW-132ML-04	7.5	0.0301	16	100	15	12.5	7.5
DBGW-160ML-04	11	0.0641	16	100	20	15	10
DBGW-160LL-04	15	0.0886	19	150	15	12.5	7.5
DBGW-180MB-04	18.5	0.1256	19	150	25	20	12.5
DBGW-180LB-04	22	0.1726	24	270	27.5	22.5	15
DBGW-200LB-04	30	0.2226	24	270	31	24	12
Speed 1000 min <sup>-1</sup>							
DBGW-080BH-06	0.55	0.00275	10	10	4	3.5	3
DBGW-090LX-06	0.75	0.00345	10	10	5	3.75	2.5
DBGW-090LD-06	1.1	0.00345	11	20	7.5	6.25	4
DBGW-100LB-06	1.5	0.00705	11	20	11.25	8.75	5.5
DBGW-112MB-06	2.2	0.0138	13	50	12.5	10	6.25
DBGW-132SL-06	3.0	0.0311	13	50	17.5	13.75	8.75
DBGW-132ML-06	4.0	0.0311	13	50	22.5	17.5	12.5
DBGW-132MN-06	5.5	0.0391	16	100	25	20	15
DBGW-160ML-06	7.5	0.1001	16	100	35	27.5	18.75
DBGW-160LL-06	11	0.1356	19	150	55	42.5	27.5
DBGW-180LB-06	15	0.1496	24	270	42.5	35	22.5
DBGW-200LB-06	18.5	0.2926	24	270	80	65	47
DBGW-200LD-06	22	0.2926	24	270	80	65	47
Speed 750 min <sup>-1</sup>							
DBGW-100LB-08	0.75	0.00705	11	20	12.5	10	6.25
DBGW-100LD-08	1.1	0.00805	11	20	20	16.25	10
DBGW-112MB-08	1.5	0.0138	13	50	22.5	17.5	12.5
DBGW-132SL-08	2.2	0.0321	13	50	25	22.5	12.5
DBGW-132ML-08	3.0	0.0411	13	50	30	25	16.25
DBGW-160ML-08	4.0	0.0811	16	100	35	30	20
DBGW-160MN-08	5.5	0.0981	16	100	45	37.5	22.5
DBGW-160LL-08	7.5	0.1426	19	150	60	47.5	30
DBGW-180LB-08	11	0.1726	24	270	95	75	50
DBGW-200LB-08	15	0.2926	24	270	150	135	120

Higher outputs, other voltages, frequencies or brake torques on request.

For further motor data see output tables of the series DNGW.

<sup>1</sup> By means of these figures all necessary conversions regarding the switching frequency or permissible conditions of the moment of inertia can be made.

The lower limit of the switching frequency of any motor is 20 c/h.  
Please contact us for smaller switching frequencies

Example a: DBGW-112MB-04, S4, 40%, 120 c/h

$$\begin{aligned}\Sigma J &= ? \\ c/h \cdot J &= 7.5 \text{ of table} \\ \Sigma J &= \frac{7.5}{120} = 0.0625 \text{ kgm}^2\end{aligned}$$

Example b: DBGW-112MB-04, S4, 60%

$$\begin{aligned}c/h &= ? \\ \Sigma J &= 0.05 \text{ kgm}^2 \\ c/h \cdot J &= 5.0 \\ c/h &= \frac{5}{0.05} = 100\end{aligned}$$

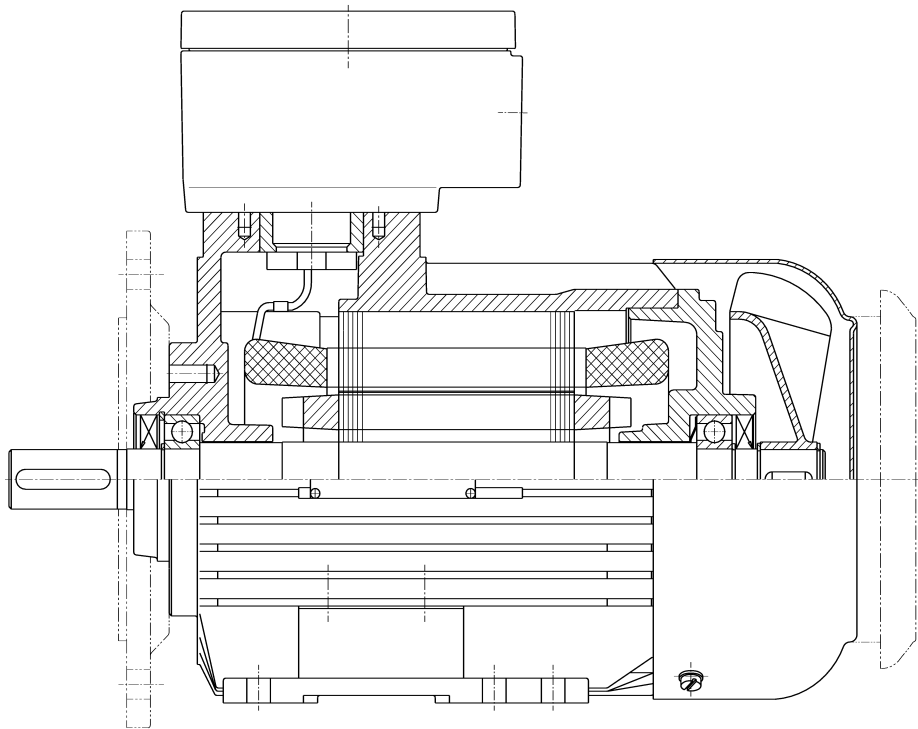
**Series DBGW, Dimension drawings**

Frame size	IM B3, IM V5, IM V6	IM B5, IM V1, IM V3	IM B35, IM V15, IM V36
	Terminal box on top	Terminal box on top	Terminal box on top
071–200	<b>MLD00-0028</b>	<b>MLD00-0029</b>	<b>MLD00-0030</b>

The indicated dimension drawings are included in the Appendix of this technical list from Page 247 in ascending order.

Technical explanations

Sectional view  
Three-phase motor Type DNGW-



Type series D

Stator frame, ventilation

Frame size	Material	Frame Feet <sup>1</sup>	Surface	End shield Material	Fan cowl Material	Material	Fan suitable for
71 80 90 100 112	Cast iron	cast-on	with cooling fins	Cast iron	Sheet steel galvanized	Plastic (=Non-sparking)	bi-directional

<sup>1</sup> For foot-mounting types only.

The cooling-air flow from NDE to DE must not be hindered.  
The intake area of the fan cowl must be kept clear.

In standard version the end shield DE is provided with centering and mounting thread to install subsequently a flange disk for mounting type B5, V1 or B14, V18.

## Bearings

## Greasing

### Bearings

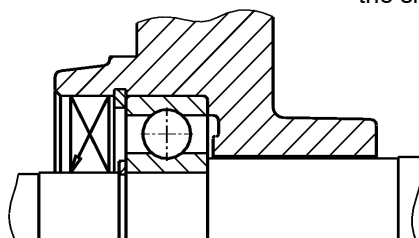
The motors have deep-groove ball bearings at the DE-side and NDE-side.

For the assignment and the designation of the bearings see the table below.

### Antifriction bearings

Frame size	No. of poles	Driving-end bearing		Non-driving end bearing	
		Mounting IM B 3, IM B 5	Vertical mounting types	Mounting IM B 3, IM B 5	Vertical mounting types
71	2-8	6203-2Z C 3	6203-2Z C 3	6203-2Z C 3	6203-2Z C 3
80	2-8	6204-2Z C 3	6204-2Z C 3	6204-2Z C 3	6204-2Z C 3
90	2-8	6205-2Z C 3	6205-2Z C 3	6205-2Z C 3	6205-2Z C 3
100	2-8	6206-2Z C 3	6206-2Z C 3	6206-2Z C 3	6206-2Z C 3
112	2-8	6206-2Z C 3	6206-2Z C 3	6206-2Z C 3	6206-2Z C 3

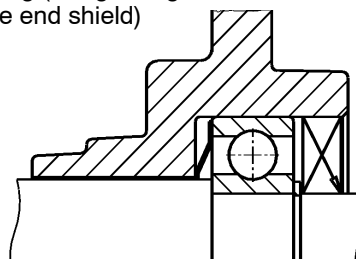
DE bearing



Frame sizes 71–112

Bearing at the driving end is designed as axial fixed bearing (Seeger ring on the shaft and in the end shield)

NDE bearing



### Greasing

The bearings of frame sizes 71 to 112 have permanent lubrication. According to experience the grease filled-in at the factory will be sufficient for several years. The grease life depends on the motor speed, the operating condi-

tions and the size of the bearings. In case of unfavourable operating conditions (e.g. increased ambient temperature, very dusty or corrosive atmosphere, outdoor installation) or motors with vertical shaft the periods decrease by about

30%. They are indicated in the below table.

As a general principle a lithium-saponified antifriction bearing grease with a melting point above 180°C is used.

### Grease life

Frame size	Grease life with permanent lubrication in service hours at rated speed						Grease quantity in grammes per bearing Permanent lubrication
	Horizontal mounting (B)			Vertical mounting (V)			Grease filling
	3000 1/min	1500 1/min	≤ 1000 1/min	3000 1/min	1500 1/min	≤ 1000 1/min	
71	33000	33000	33000	33000	33000		5
80				24000			9
90							11
100							15
112				17000			25

The indicated grease life or relubrication intervals are applicable for an ambient temperature of max. 40°C.

For every 10°C temperature rise, the lubrication interval is to be reduced by factor 0.7 of the value shown in the table (max. 20°C = factor 0.5).

Twice the grease life can be expected at an ambient temperature of ≤ 25°C, however. Intervals for operation of a 60 Hz power supply on request.

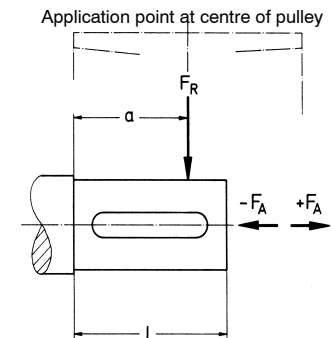
## Permissible forces at shaft end

### Weight of rotor

#### Permissible forces at shaft end

Figures are valid for bearings and driving shaft ends in this technical list. They have been based on a

calculated useful life of  $L_h = 20\,000$  hours and are permissible for horizontal and vertical shafts.



#### Permissible radial force:

a / l	a = 0				a = 0.5 l				a = l			
Speed min <sup>-1</sup>	3000	1500	1000	750	3000	1500	1000	750	3000	1500	1000	750
Frame size	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
071	0.48	0.60	0.69	0.76	0.43	0.54	0.62	0.68	0.39	0.50	0.56	0.62
080	0.64	0.81	0.93	1.02	0.57	0.72	0.83	0.91	0.51	0.65	0.74	0.82
090	0.72	0.90	1.04	1.14	0.64	0.80	0.92	1.01	0.57	0.71	0.82	0.90
100	1.01	1.28	1.45	1.61	0.90	1.15	1.30	1.43	0.81	1.04	1.17	1.30
112	0.99	1, 23	1.42	1.57	0.87	1.09	1.25	1.39	0.79	1.08	1.12	1.24

For the maximum admissible shaft deflection within the ignition gap, the indicated radial forces are not allowed to be exceeded!

#### Permissible axial force:

The following values are permissible for pure axial load. The corresponding bearings are specified in this technical list and calculations

are based on a fatigue life of  $L_h = 20\,000$  hours. The below indicated values are valid for a 50 Hz power supply. For operating at

60 Hz the values have to be reduced by 6% in order to achieve the same service life.

Design Speed 1/min	Horizontal shaft				Vertical shaft – upthrust				Vertical shaft – downthrust			
	3000	1500	1000	750	3000	1500	1000	750	3000	1500	1000	750
Frame size	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
+F <sub>A</sub> or -F <sub>A</sub>												
71	0.27	0.34	0.39	0.43	0.35	0.46	0.51	0.55	0.33	0.43	0.47	0.52
80	0.36	0.45	0.52	0.57	0.47	0.60	0.69	0.76	0.43	0.55	0.62	0.69
90	0.41	0.51	0.59	0.65	0.54	0.68	0.79	0.86	0.48	0.61	0.69	0.77
100	0.55	0.69	0.79	0.88	0.75	0.94	1.07	1.11	0.64	0.81	0.92	1.03
112	0.55	0.69	0.79	0.88	0.76	0.98	1.10	1.14	0.63	0.77	0.89	1.00

#### Weight of rotor in kg (incl. shaft and fan)

Frame size	3000 1/min	1500 1/min	1000 1/min	750 1/min
071 AV	1.23	1.46	1.76	1.76
071 BV	1.41	1.72	2.09	2.09
080 AV	2.00	2.37	3.19	3.19
080 BV	2.29	2.80	3.790	3.790
090 SV	3.19	3.85	4.58	4.58
090 LV	3.62	4.52	5.50	5.50
100 LV	5.04	5.94	—	—
100 LW	—	6.94	7.19	7.19
112 MV	6.6	9.79	10.50	10.50

### Terminal box description / Basic layouts

The terminal boxes are designed in protection type "Increased safety" EEx e II in compliance with EN 50014 and EN 50019 and in enclosure IP 55 in compliance with DIN 40050/July 1980 and are made of cast iron. The terminals are therefore protected against accidental contact, dust accumulation and water jets from all directions, provided that the input connecting lead has been installed correctly. On request, terminal boxes are available in protection type "Flame-proof enclosure" in compliance with EN 50014 and EN 50018. From frame size 080 the terminal

boxes are rotatable at 90° intervals so that the input lead can be connected from several sides.

Terminal boxes of flameproof motors are fitted to the top of horizontal mounting types such as IM B 3. The construction of the terminal boxes is illustrated below. The number of terminals and the cable diameters are shown in the following tables.

The type and design possibilities of cable entry parts for input connection leads are shown in the tables and diagrams. The type of monitoring device depends on the number of possible additional terminals in

the main terminal box. PTC thermistors in combination with the Loher CALOMAT® device CK 14 can be connected to two additional terminals. For the connection of a space heater two terminals are also required.

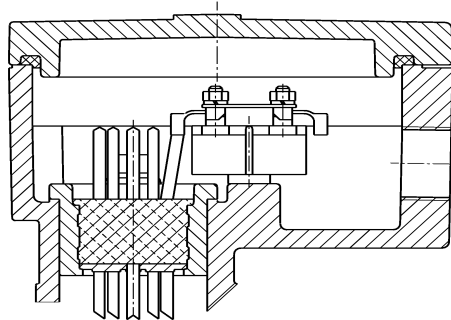
The earthing conductor connection is located in the terminal box and the earth terminal is located on the outside of the motor.

® = Registered trademark of the Loher GmbH

#### Frame size 071

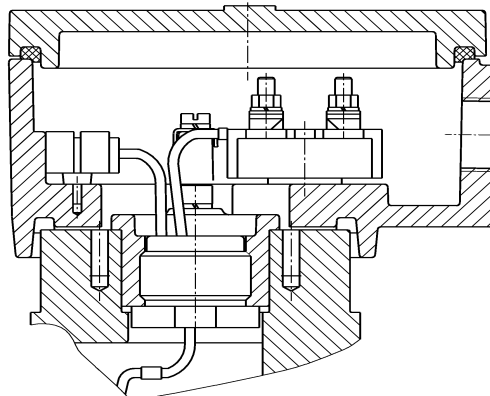
Cable gland for multiple stranded cable and terminal board with 6 terminals.

The terminal box is cast-on to the motor frame. Therefore, cable entry is only possible from the non-driving end.



#### Frame sizes 080–112

Cable gland for multiple stranded cable and terminal board with 6 terminals.



## Terminals and Cable entries

<b>Terminal box,</b>	<b>Type DNGW</b>
Enclosure:	IP 55
Protection type:	EEx e II to EN 50014 / EN 50019
Optional:	EEx d IIC to EN 50014 / EN 50018
Housing material:	Cast iron

Frame size	Standard version with 6 terminals		
	Connection diameter [mm <sup>2</sup> ]	Additional terminals in main terminal box max. number x cross section [mm <sup>2</sup> ] <sup>1</sup>	Max. conductor diameter [mm <sup>2</sup> ]
071	2.5	4 x 2.5	2.5
080	4	6 x 2.5	4
090	4	6 x 2.5	4
100	4	6 x 2.5	4
112	4	6 x 2.5	4

<sup>1</sup> Rated voltage 420V

Number and size of the entry threads see dimension drawing.  
Cable glands (on special order) see below table.

### Cable glands for Type DNGW

For delivery the entry threads are sealed with certified plugs.  
Only on special order the terminal boxes in protection type EEx e II are delivered with cable gland according to the table. (No cable gland available for EEx d IIC)

Frame size	Standard cable glands	
	Terminal box EEx protection	EEx e II
	Cable gland type	HSK-M-Ex <sup>2</sup>
	Entry thread <sup>1 3</sup>	Cable diameter [mm]
071	1 x M 20 x 1.5	6 – 12
080	1 x M 25 x 1.5	9 – 16
090	1 x M 25 x 1.5	9 – 16
100	1 x M 32 x 1.5	9 – 16
112	2 x M 32 x 1.5	9 – 16

Entry threads for PTC thermistors, heating: EEx e II: M 20 x 1.5 D = 6–12 mm

- <sup>1</sup> Number and size of entry threads from frame size 080 to DIN 42925  
<sup>2</sup> Cable glands are suitable for unshielded and non-armoured cables and leads.  
<sup>3</sup> Other threads, number and size on request.

## Three-phase motors with led out cable

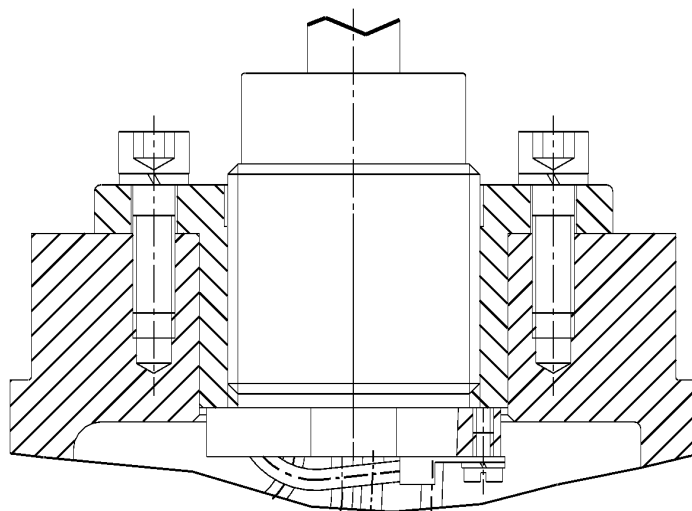
### Three-phase motors with led out cable

Three-phase motors with led out connecting cable are used in machines or ventilating equipment where due to the narrow space conditions the electrical connection is made via a separately located terminal box.

#### Design:

The motors correspond with the TEFC designs in this technical list, only that instead of the terminal box a bushing plate is installed.  
Explosion protection: EEx d IIC T4

The loose end of the connection cable must be indicated in the order, standard length 1.5m. Admissible coolant temperature  $-20^{\circ}\text{C}$  up to  $+50^{\circ}\text{C}$ .



### Noise level

Type	L <sub>WA</sub> Sound power level			
	2-pole 3000 min <sup>-1</sup> L <sub>ptA</sub> dB	4-pole 1500 min <sup>-1</sup> L <sub>ptA</sub> dB	6-pole 1000 min <sup>-1</sup> L <sub>ptA</sub> dB	8-pole 750 min <sup>-1</sup> L <sub>ptA</sub> dB
DNGW-071...-	75	71	70	67
DNGW-080...-	75	71	70	67
DNGW-090S...-	80	71	70	67
DNGW-090L...-	80	73	70	67
DNGW-100LV...-	83	73	70	67
DNGW-100LW...-	83	77	70	67
DNGW-112...-	83	77	70	69



## Preferred series DNGW, Special designs

Frame size	71	80	90	100	112
Mounting types IM B6, IM B7, IM B8, IM V6	○	○	○	○	○
IM B5, IM V3	●	●	●	●	●
IM V1, IM V5	●	●	●	●	●
IM B35, IM V15	●	●	●	●	●
IM B14, IM B34, IM V18, IM V19 <sup>1</sup>	●	●	●	●	●
Radial shaft sealing ring at driving end	●	●	●	●	●
Fixed bearing at non-driving end	N	N	N	N	N
Flange with tolerance R (reduced) acc. to DIN 42955	●	●	●	●	●
Fan made of aluminium	A	A	A	A	A
Terminal box in protection type "Flameproof enclosure"	●	●	●	●	●
Second standard shaft end	●	●	●	●	●
Non-standard shaft end	●	●	●	●	●
Vibration level R (reduced) or S (special) <sup>1</sup>	●	●	●	●	●
Non-standard voltage up to 725V and/or frequency	A	A	A	A	A
Built-in PTC thermistors	●	●	●	●	●
SPM-nipples	N	N	N	N	N
Other colours than RAL 7030	●	●	●	●	●
Special painting	A	A	A	A	A
VIK-design	●	●	●	●	●
Design for increased ambient temperatures	A	A	A	A	A

<sup>1</sup> Vibration level S (special) on request, possibly only available with output reduction.

○ no extra charge  
● extra charge

A on request  
N cannot be supplied

## Preferred series DNGW, Output tables

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**380V–420V / 655–725V –Δ/Y – 50 Hz**  
**Class F insulation, Utilization to B**  
**Temperature class T4**

**Types: DNGW**      **Number of poles: 2, 4**      **– Wide voltage range**

Type	Rated output	Rated speed	Rated current at		Efficiency 4/4	Efficiency 3/4	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	Δ	Y	η	η	cosφ		M <sub>A</sub> /M <sub>N</sub>	M <sub>K</sub> /M <sub>N</sub>	I <sub>A</sub> /I <sub>N</sub>	kg m <sup>2</sup>	approx. kg
			380V – 420V A	655V – 725V A	%	%							

### Speed 3000 min<sup>-1</sup>

DNGW–071AV–02	0.37	2800	0.90	0.52	72.5	73.6	0.86	HS 5	3.0	2.8	5.6	0.00036	15
DNGW–071BV–02	0.55	2815	1.29	0.73	76.3	75.7	0.83	HS 5	3.0	3.1	6.0	0.00044	16
DNGW–080AV–02	0.75	2750	1.70	0.98	73.0	74.2	0.88	HS 5	2.3	2.6	5.0	0.00070	24
DNGW–080BV–02	1.1	2790	2.35	1.35	77.3	79.2	0.87	HS 5	2.6	2.9	5.8	0.00086	26
DNGW–090SV–02	1.5	2850	3.30	1.90	75.4	76.3	0.87	HS 5	3.0	2.8	6.2	0.00141	32
DNGW–090LV–02	2.2	2845	4.70	2.70	77.7	79.0	0.87	HS 5	3.0	2.65	5.9	0.00172	34
DNGW–100LV–02	3	2845	6.69	3.80	75.4	75.5	0.86	HS 5	2.0	2.9	6.4	0.00288	43
DNGW–112MV–02	4	2890	8.20	4.50	83.5	83.5	0.88	HS 5	2.5	2.95	7.6	0.00490	58

### Speed 1500 min<sup>-1</sup>

DNGW–071AV–04	0.25	1355	0.68	0.39	68.1	73.0	0.78	HS 5	2.3	2.5	4.0	0.00053	15
DNGW–071BV–04	0.37	1350	1.00	0.58	72.6	73.4	0.75	HS 5	2.4	2.9	4.4	0.00065	16
DNGW–080AV–04	0.55	1390	1.42	0.80	74.0	76.1	0.80	HS 5	2.3	2.7	4.6	0.00105	24
DNGW–080BV–04	0.75	1375	1.85	1.07	73.8	75.8	0.80	HS 5	2.3	2.6	4.5	0.00132	26
DNGW–090SV–04	1.1	1410	2.50	1.45	78.3	78.3	0.81	HS 5	2.3	2.4	5.0	0.00221	32
DNGW–090LV–04	1.5	1410	3.40	1.95	80.1	79.1	0.80	HS 5	2.5	2.6	5.3	0.00277	35
DNGW–100LV–04	2.2	1405	4.90	2.83	77.5	78.0	0.84	HS 5	2.0	2.2	4.8	0.00425	43
DNGW–100LV–04	3	1415	6.47	3.74	81.0	82.8	0.83	HS 5	2.2	2.3	5.3	0.00536	46
DNGW–112MV–04	4	1430	8.20	4.70	85.0	85.4	0.84	HS 5	2.2	2.8	6.6	0.01053	60

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**380–420 / 655–725V –Δ/Y – 50 Hz**  
Class F insulation, Utilization to B  
**Temperature class T4**

**Types: DNGW                      Number of poles: 6, 8                      – Wide voltage range**

Type	Rated output	Rated speed	Rated current at		Efficiency 4/4 $\eta$	Efficiency 3/4 $\eta$	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	380V – 420V A	655V – 725V A	%	%	cosφ		M <sub>A</sub> /M <sub>N</sub>	M <sub>K</sub> /M <sub>N</sub>	I <sub>A</sub> /I <sub>N</sub>	kg m <sup>2</sup>	approx. kg

#### Speed 1000 min<sup>-1</sup>

DNGW-071BV-06	0,25	940	0,85	0,49	60,0		0,72	HS 5	2,4	2,5	3,25	0,00103	16
DNGW-080AV-06	0,37	925	1,11	0,64	59,3	59,0	0,72	HS 5	2,1	2,5	3,6	0,00198	25
DNGW-080BV-06	0,55	915	1,51	0,87	67,0	64,5	0,74	HS 5	2,35	2,4	4,1	0,00246	27
DNGW-090SV-06	0,75	915	2,10	1,20	72,0	71,6	0,74	HS 5	1,8	2,0	3,7	0,00351	32
DNGW-090LV-06	1,1	915	3,00	1,70	70,0	70,5	0,73	HS 5	2,1	2,25	4,1	0,00437	35
DNGW-100LV-06	1,5	930	3,70	2,10	73,0	73,8	0,77	HS 5	2,2	2,3	4,7	0,00698	46
DNGW-112MV-06	2,2	960	5,00	2,90	76,0	76,5	0,78	HS 5	2,6	2,7	6,1	0,01619	60

#### Speed 750 min<sup>-1</sup>

DNGW-071BV-08	0,12	655	0,53	0,31	45,0	45,7	0,71	HS 5	1,8	2,1	2,4	0,00103	16
DNGW-080BV-08	0,25	680	0,92	0,53	55,2	81,8	0,70	HS 5	2,1	2,3	3,1	0,00246	27
DNGW-090SV-08	0,37	685	1,26	0,73	66,0	65,0	0,65	HS 5	1,7	1,9	3,0	0,00351	32
DNGW-090LV-08	0,55	685	1,76	1,02	69,0	70,0	0,66	HS 5	1,75	2,0	3,1	0,00437	35
DNGW-100LV-08	0,75	690	2,30	1,33	69,0	68,5	0,69	HS 5	1,7	2,0	3,5	0,00694	43
DNGW-100LV-08	1,1	695	3,50	2,00	70,0	69,5	0,69	HS 5	2,0	2,3	3,8	0,00894	46
DNGW-112MV-08	1,5	710	4,15	2,40	78,0	78,0	0,67	HS 5	2,0	2,5	4,3	0,01619	60

Type series D

Preferred series DNGW, Dimension drawings

Frame size	IM B3, IM V5, IM V6		IM B5, IM V1, IM V3		IM B35, IM V15, IM V36	IM B14, IM V18, IM V19		IM B34, IM V5/IM V18, IM V6/IM V19
	Terminal box on top	Cable entry	Terminal box on top	Cable entry	Terminal box on top	Terminal box on top	Cable entry	Terminal box on top
071–112	MVD00 -0001	—	MVD00 -0002	MVD00 -0007	MVD00 -0003	MVD00 -0004	—	MVD00 -0005

The indicated dimension drawings are included in the Appendix of this technical list from Page 247 in ascending order.

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# Loher “CHEMSTAR” Motor

Loher three-phase motors for applications in the chemical and petrochemical industry

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## General

### An economical and ecological alternative

The Loher GmbH with its product diversity is among the leading manufacturers in the field of explosion-proof electric drive systems.

Already in 1962 W. Egli (BASF) gave a basic description of the “Requirements of Heavy Chemical Engineering to Electric Motors” [1]; his paper makes clear that besides the provisions for protection against explosion laid down by laws and standards there are quite a number of additional requirements, due to operating conditions for electrical installations in the chemical industry: IP enclosure, protection against corrosion, noise reduction, service life, maintenance, repair, compatibility, avail-

ability, efficiency and ecology are relevant examples.

Loher understood how to meet these requirements by combining the necessary properties as a package in the Loher “CHEMSTAR” Motor.

The major operating companies established their own rules for the design of three-phase motors early on. An example are the recommendations originating from 1975 and revised in 1992/1999 [2] “Three-Phase Asynchronous Motors”; published by the VIK (Verband der industriellen Energie- und Kraftwirtschaft e.V. – Committee of the Industrial Power and Power

Utilities). Furthermore, most of the chemical factories and major designing offices established particular specifications, partially even more demanding than the VIK-requirements.

After many years of experience in dealing separately with these varying specifications, Loher analyzed, screened and compiled this great number of single items in a manufacturer standard, where the single requirements are not only accumulated, but summarized in a reasonable, cost-optimized overall package. The product of this development over years results for the user in an optimum of quality, costs, administration and documentation.

## Technical Details

The Loher “CHEMSTAR” Motor is available for the following technical data ranges:

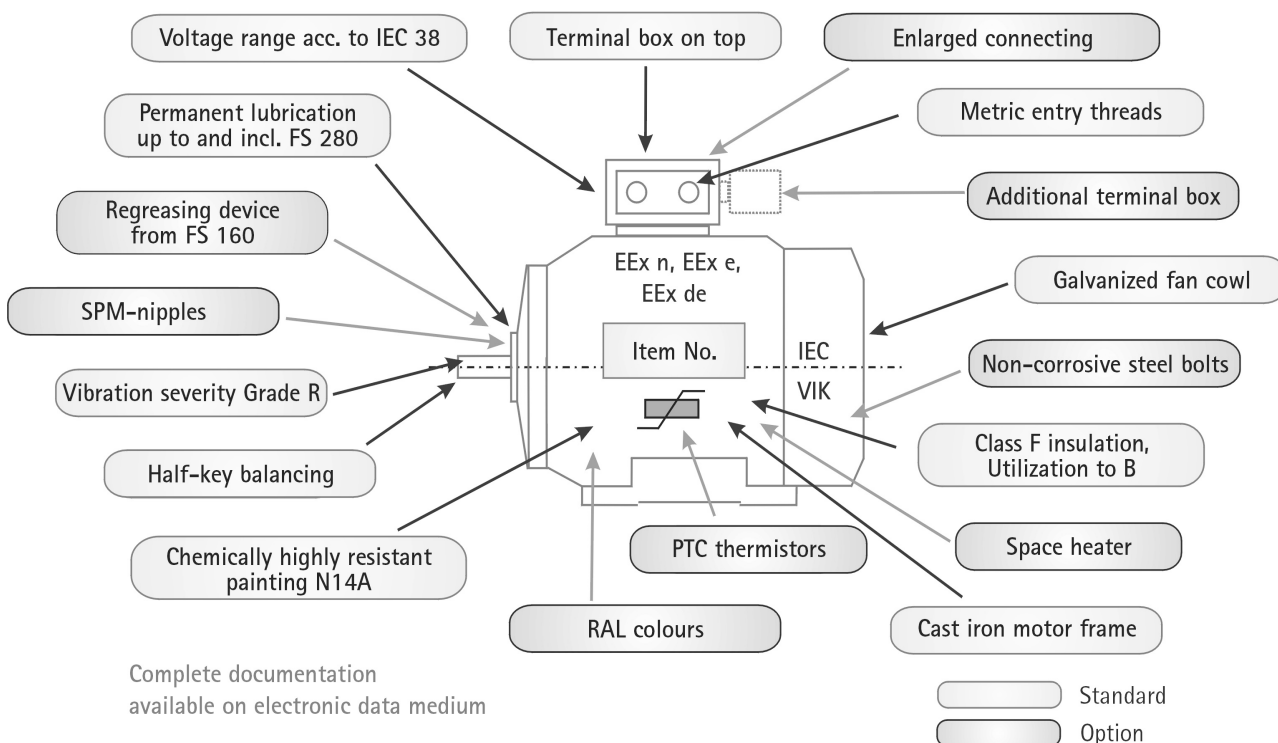
Frame sizes:	090 ... 355 mm (range of standard motors)
Rated outputs:	up to 315 kW
Speeds:	3000 / 1500 / 1000 min <sup>-1</sup> at 50 Hz; also for 60 Hz and pole-changing; infinitely variable at the inverter
Voltage:	Usual low voltages and voltage ranges in conformity with DIN IEC 38
Enclosure:	IP 55
Types of protection:	EEx n A II EEx e II EEx de IIC

## Technical design

The Loher "CHEMSTAR" Motor joins many design features of which a detailed description is

not possible in this brochure. The scheme gives a survey, being completed and explained in the

following by some important details.



## Cast Iron Motor Frames

For Frame sizes 90 ... 315 the Loher "CHEMSTAR" Motor has stator frames, end shields and terminal boxes of cast iron GG-20.

The technical advantages (corrosion, strength, vibration damping) of grey

cast iron compared with the usual aluminium die cast alloys for standard motors up to approx. shaft height 160 (200) are known. However, grey cast iron also offers ecological advantages, the socio-political importance of which is increasing:

Relative/absolute comparison of energy expenditure and waste products when manufacturing aluminium and cast iron respectively (Basis: 1 t)

	Primary Aluminium		Secondary Aluminium		Cast Iron	
	60% Portion		40% Portion			
	Factor	Absolute	Factor	Absolute	Factor	Absolute
Energy application	70.7	45517 kWh	7.9	5064 kWh	1	644 kWh
Waste water	51.1	15.33 m <sup>3</sup>	1.3	0.39 m <sup>3</sup>	1	0.3 m <sup>3</sup>
Waste products	143	3638 kg	2.9	72.5 kg	1	25.43 kg
Dust	4.7	22.24 kg	0.08	0.4 kg	1	4.76 kg

Max. 40% portion of secondary aluminium! Cast iron in Germany of 100% scrap material!

## Metric entry threads and cross sections

### Cable glands and cross sections

Frame size	Entry threads <sup>1</sup>	Cable glands <sup>2</sup>		Max. cross section		Special design for larger cross section max.	
		Motor type AM.A	Motor type AM.K / EM.. / DN..	[mm <sup>2</sup> ]		[mm <sup>2</sup> ]	
		Type HSK-K Clamping range [mm]	Type HSK-M-Ex Clamping range [mm]	Motor type AM.. / EM..	Motor type DN..	Motor type AM.. / EM..	Motor type DN..
71	1 x M 25 x 1.5	—	10 – 16	—	2.5 / 6 <sup>3</sup>	—	—
80	1 x M 25 x 1.5	—	10 – 16	—	2.5 / 6 <sup>3</sup>	—	—
90	1 x M 25 x 1.5	9 – 16	10 – 16	2.5 / 6 <sup>3</sup>	2.5 / 6 <sup>3</sup>	—	—
100	1 x M 32 x 1.5	13 – 20	13 – 20	2.5 / 6 <sup>3</sup>	2.5 / 6 <sup>3</sup>	10 / 25 <sup>3</sup>	—
112	2 x M 32 x 1.5	13 – 20	13 – 20	2.5 / 6 <sup>3</sup>	2.5 / 6 <sup>3</sup>	10 / 25 <sup>3</sup>	—
132	2 x M 32 x 1.5	13 – 20	13 – 20	10 / 25 <sup>3</sup>	10 / 25 <sup>3</sup>	10 / 25 <sup>3</sup>	—
160	2 x M 40 x 1.5	22 – 32	22 – 32	10 / 25 <sup>3</sup>	10 / 25 <sup>3</sup>	16 / 50 <sup>3</sup>	—
180	2 x M 40 x 1.5	22 – 32	22 – 32	16 / 50 <sup>3</sup>	2.5 – 35	70	—
200	2 x M 50 x 1.5	32 – 38	32 – 38	16 / 50 <sup>3</sup>	6 – 70	70	120
225	2 x M 50 x 1.5	32 – 38	32 – 38	16 / 50 <sup>3</sup>	6 – 70	70	120
250	2 x M 63 x 1.5	37 – 44	37 – 44	6 – 70	6 – 70	—	120
280	2 x M 63 x 1.5	37 – 44	37 – 44	6 – 70	10 – 95	95	240
315S/M	2 x M 63 x 1.5	37 – 44	37 – 44	16 – 150	16 – 150	300	240
315L	2 x M 63 x 1.5	37 – 44	37 – 44	120 – 300	120 – 300	—	—
355LB	2 x M 63 x 1.5	37 – 44	37 – 44	120 – 300	120 – 300	—	—

Entry threads for PTC thermistors, heating: M 20 X 1.5 for cable D = 6 – 12

- <sup>1</sup> Entry threads are sealed with dummy plugs  
<sup>2</sup> Cable glands are only supplied on special order  
<sup>3</sup> max. cross section for cable connection with cable lug

Type	Frame size	Version
AM.. / EM..	090–225	Terminal box bottom part with entry thread
	250–280	Terminal box bottom part with removable entry plate
	315–355	Lengthwise divided terminal box with removable entry plate
DN ..	090–180	Terminal box bottom part with entry thread
	200–280	Terminal box bottom part with removable entry plate
	315	Lengthwise divided terminal box with removable entry plate

## Features of the Loher “CHEMSTAR” Motor

Mechanical Construction		Motor Design			
		without Ex-protection <sup>6</sup>	EEx n A II	EEx e II	EEx de II C
		FS 90 – 355	FS 90 – 355	FS 90 – 355	FS 71 – 315
Design:	Industrial motor acc. to IEC and VIK <sup>8</sup>	●	●	●	●
Housing material:	Cast iron / Steel	●	●	●	●
Enclosure:	IP 55	●	●	●	●
	IPW 55, IP 56 <sup>9</sup>	EP	EP	EP	EP
Mounting type: <sup>5</sup>	IM B3	●	●	●	●
	IM B5, IM B 35, IM V1, IM V3, IM V5, IM V18, IM B14, IM B34	EP	EP	EP	EP
Painting:	N14A higher chemical resistance	●	●	●	●
Rating plate: <sup>1</sup>	acc. to IEC and VIK	●	●	●	●
Item No.:	acc. to customer request	●	●	●	●
Permanent lubrication:	up to and incl. frame size 280	●	●	●	●
Regreasing device:	possible from frame size 160	EP	EP	EP	EP
Vibration severity:	according to Grade R	●	●	●	●
Terminal box:	on top: cast iron	●	●	●	●
	by 4 x 90° rotatable (from frame size 090)	●	●	●	●
Balancing:	Half-key: Q 2.5	●	●	●	●
Noise:	≤ 77 + 3 dB A at rated load <sup>7</sup> (Individual values on request)	●	●	●	●
SPM-nipples:	possible from frame size 132	EP	EP	EP	EP
Bolts:	of non-corrosive steel	EP	EP	EP	EP
Fan cowl:	galvanized steel	●	●	●	●
Condensate drain:	Standard from frame size 200	●	●	●	–
	possible from frame size 132	EP	EP	EP	–
Enlarged connecting:	without Ex, EEx nA II, EEx e II: from FS 090 EEx de IIC: from FS 200	EP	EP	EP	EP
Additional terminal box:	possible from frame size 132	EP	EP	EP	EP
Space heater:	possible from frame size 132	EP	–	–	EP
Inverter operation: <sup>1,2,3</sup>		EP <sup>2,4</sup>	EP <sup>2,4</sup>	EP	EP <sup>2,4</sup>
<b>Electrical design</b>					
Thermal utilization:	Insulation class F / Utilization B	●	●	●	●
Supply voltage:	Range 380–420V Δ / 655–725V Y	●	●	●	
	Range 218–242V Δ / 380–420V Y	EP	EP	EP	EP
	fixed 500V	●	●	●	●
PTC thermistor (for TMS):	as sole protection <sup>2</sup> (up to and incl. FS 250)	EP	EP	–	EP
	as additional protection	EP	EP	EP	EP
<b>Documentation:</b>	Dimension drawing, data sheet, certificate, on electronic data medium, if required	●	●	●	●

- Basic equipment of Loher “CHEMSTAR” Motor
- not available
- EP Option against extra price
- FS Frame size (shaft height)
- TMS Thermal motor protection

See explanations on the next page



### Explanations:

- 1 Motors for inverter operation are provided with an additional rating plate with data acc. to the Technical List UN03 for Md ~ n2; Md = constant at 1 : 3 and 1 : 5; for frame size 71/80 in EEx-n design no inverter operation possible!
- 2 Motors for inverter operation with PTC thermistor and if required TMS-test, PTB or LoC. Further technical data see Technical List UN 03.
- 3 Motors for inverter operation mostly certified for 100 Hz.
- 4 Further technical data see Technical List UN 03.
- 5 with protective cover for IM V1 and IM V5
- 6 Motors mechanically not suitable for use in Zone 2 acc. to DIN VDE 0165; 1991
- 7 Measures for further noise reduction acc. to technical list or on request
- 8 VIK – Verband der industriellen Energie- und Kraftwirtschaft e.V. (Committee of the Industrial Power and Power Utilities). Recommendation "Three-Phase Asynchronous Motors; Technical Requirements"
- 9 For various mounting types partially restrictions in the frame size range possible. Also see dimension drawing

### Electrical design

Please consider the following items:

Electrical data in the data sheets of the 2-, 4- and 6-pole design are **calculated values**.

**Within the VDE tolerances** these are in accordance with the measured and stamp data to be expected.

The values for

- thermal utilization
- speed
- starting currents
- power factors
- efficiencies
- torques and rotor classes
- LRT (locked rotor times)

of the "multi-range motor 380–420V" refer as usually and explicitly indicated to the mean range,

i.e. to 400V. Therefore they are identical with those of the 400V motor.

The partial load currents refer to 400V.

As to the multi-range motors the rated currents for the "non-Ex motors" are indicated as usually for 380V–400V–420V.

The rated currents of the multi-range motors in Ex-design are indicated as usually for 380–420V, which means the "maximum current" of the "range". For current monitoring the "maximum current" has therefore to be set at the device.

The figure for  $I_A/I_N$  also refers to 400V (!).

The multi-range motor might there-

fore have a higher rated current and a lower ratio  $I_A/I_N$  than the 400V motor (at the same absolute value of the starting current).

For other (single) voltages than 400V the values for power factor "cos.  $\varphi$ " and efficiency " $\eta$ " remain the same like for the 400V motor (also for partial load operation) due to an accordingly changed winding. Therefore the currents can be converted linearly to the voltages:

$$I^* = I_{400} \cdot 400V / U^*$$

e.g.:

400V,  $I = 12$  A acc. to data sheet:

$$500V, I = 12 \cdot 400/500 = 9.6 \text{ A}$$

### Inverter Operation

For optimization of process sequences and energy saving speed-variable drive systems are increasingly demanded in the chemical and petrochemical industry. Motors of protection type "d" and Temperature class T4 can – with few restrictions – be used without special cer-

tification by an approved authority, when they are equipped with thermistors as sole protection. On request the Loher "CHEMSTAR" motor can be equipped with PTC thermistors and therefore later also be operated at the inverter. As to

the thermally admissible frequency ranges and torques a detailed documentation is available with the Technical List UN 03. For other protection types and for the standard version IP55 the thermistor as sole protection is also an option.

### Mechanical construction

See information to the type series in this technical list.

### Availability

Today the availability within a short time is an essential advantage, especially for customers in the chemical and petrochemical industry. Since most of the plant operators

do not have their own service and assembly departments, the stock of spare motors is ever decreasing. Here an alternative is offered by the Loher “CHEMSTAR” Motor.

The most common types are kept in stock of Loher’s own logistics centre and available at the customer within a few days.

### Loher “CHEMSTAR” motors, Dimension drawings

#### Series A.../ E...:

Compiled dimension drawings see  
Series ANGA, AMGA, AVGA, AMGK, ENGV, EMGV  
(see page 86)

#### Series DNGW / DNSW:

Compiled dimension drawings see  
Series DN..  
(see page 184)

Single dimension drawings, data sheets and characteristic curves of the Loher “CHEMSTAR” motors for the pole numbers 02, 04 and 06 are assigned to the below output tables in the CD Version . (not in the printed version of this technical list).

## Loher "CHEMSTAR" motors, Series AMGA; Output tables

### Three-phase motors with squirrel cage

Totally enclosed fan-cooled, enclosure IP 55

Types: AMGA

Number of poles: 2

**380–420V – 50 Hz**

Class F insulation, Utilization to B

Outputs up to AMGA-315 MB

in accordance with DIN EN 50347

Type	Rated output	Rated speed	Rated current at		Effi- ciency 4/4 η	Effi- ciency 3/4 η	Effi- ciency class <sup>1</sup>	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia	Net weight
			380V – 420V				<div>EFF</div>			with direct-on starting as a multiple of the			J	
	kW	min <sup>-1</sup>	A	A	%	%		cosφ		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
Speed 3000 min <sup>-1</sup>														
AMGA-090LX-02	1.5	2835	3.1	– 3.3	78.4	77	2	0.88	HS 5	2.5	2.7	5.9	0.0020	22
AMGA-090LB-02	2.2	2850	4.5	– 4.7	81.7	80	2	0.88	HS 5	2.9	3.0	6.4	0.0020	22
AMGA-100LB-02	3	2880	6	– 6.2	84.2	83	2	0.88	HS 5	2.7	3.0	7.0	0.0039	35
AMGA-112MB-02	4	2880	7.8	– 7.5	85.5	84	2	0.92	HS 5	2.9	3.5	7.2	0.0060	38
AMGA-132SB-02	5.5	2900	10.9	– 11	86.5	85.5	2	0.88	HS 5	3.0	3.3	6.6	0.0110	53
AMGA-132SD-02	7.5	2910	14.5	– 15	88	87	2	0.88	HS 5	3.4	3.8	7.4	0.0140	56
AMGA-160MB-02	11	2920	22	– 20	88.5	88.2	2	0.87	HS 5	2.7	2.9	5.9	0.0364	104
AMGA-160MD-02	15	2920	29	– 28	90	89.5	2	0.89	HS 5	2.7	3.0	6.0	0.045	106
AMGA-160LB-02	18.5	2920	34.5	– 32	91	90	2	0.90	HS 5	2.9	3.0	6.4	0.057	130
AMGA-180MB-02	22	2950	42	– 42	91	90	2	0.87	HS 5	2.2	3.0	7.0	0.094	162
AMGA-200LG-02	30	2960	54	– 54	92.5	91	2	0.91	HS 4	2.4	2.6	7.4	0.182	252
AMGA-200LJ-02	37	2955	67	– 65	93	92	2	0.90	HS 4	2.6	2.8	7.5	0.200	262
AMGA-225ME-02	45	2965	82	– 78	93.5	92.5	2	0.89	HS 5	2.2	2.7	7.1	0.247	305
AMGA-250ME-02	55	2975	101	– 101	94.1	93.2	1	0.86	HS 5	2.3	3.2	7.4	0.45	410
AMGA-280SG-02	75	2980	134	– 125	94.7	94	1	0.90	HS 4	2.2	2.2	6.8	0.88	555
AMGA-280MG-02	90	2975	160	– 150	95	94.5	1	0.90	HS 4	2.0	2.2	6.5	1.03	590
AMGA-315SB-02 <sup>2</sup>	110	2975	198	– 185	95	94.5		0.89	DS 4	2.0	2.4	6.5	1.61	735
AMGA-315MB-02 <sup>2</sup>	132	2980	240	– 220	95.5	95		0.89	DS 4	2.0	2.4	6.5	1.91	835
AMGA-315MD-02 <sup>2</sup>	160	2980	285	– 265	95.8	95.2		0.89	DS 4	2.3	2.6	6.7	2.3	905
AMGA-315LB-02* <sup>2</sup>	200	2980	355	– 320	96	95.6		0.90	DS 4	2.5	2.7	6.8	2.8	1085
AMGA-355MB-02	250	2980	450	– 410	96	95.6		0.89	DS 4	2.0	2.5	6.9	3.8	1360
AMGA-355LB-02*	315	2985	560	– 510	96.4	96		0.89	DS 4	2.2	2.7	7.2	4.7	1580

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

<sup>1</sup> Explanations see "Efficiency marking"

For special design the motors of efficiency class 2 from 5.5 kW can be upgraded to efficiency class 1. [surcharge, inquiry]

<sup>2</sup> Type AMGA-315

We reserve us the right to deliver foot-mounted types (ANSA) in welded design.

(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
**Types: AMGA**                      **Number of poles: 4**

**380–420V – 50 Hz**  
 Class F insulation, Utilization to B  
 Outputs up to AMGA-315 MB  
 in accordance with DIN EN 50347

Type	Rated output kW	Rated speed min <sup>-1</sup>	Rated current at		Efficiency 4/4 η <sub>1</sub>	Efficiency 3/4 η <sub>1</sub>	Efficiency class <sup>1</sup>	Power factor cosφ	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia	Net weight
			380V	420V						with direct-on starting as a multiple of the	with direct-on starting as a multiple of the	with direct-on starting as a multiple of the	J	
			A	A	%	%	EFF			rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 1500 min<sup>-1</sup></b>														
AMGA-090LX-04	1.1	1405	2.7 –	2.75	77	77	2	0.82	HS 4	2.1	2.3	5.0	0.0036	20
AMGA-090LB-04	1.5	1410	3.4 –	3.5	79	79	2	0.83	HS 5	2.5	2.7	5.1	0.0036	22
AMGA-100LB-04	2.2	1400	4.8 –	5	81	81	2	0.84	HS 5	2.2	2.5	5.3	0.0051	35
AMGA-100LD-04	3	1410	6.5 –	6.7	82.6	82.5	2	0.82	HS 5	2.5	2.7	5.8	0.0066	38
AMGA-112MB-04	4	1415	8.3 –	8.3	84	84	2	0.84	HS 5	2.2	2.6	5.9	0.012	41
AMGA-132SB-04	5.5	1440	11 –	11	87	87	2	0.85	HS 5	2.3	2.7	6.4	0.022	59
AMGA-132MB-04	7.5	1445	15 –	15	88	88	2	0.85	HS 5	2.6	3.0	7.2	0.030	69
AMGA-160MB-04	11	1460	21.5 –	21	90	90	2	0.84	HS 5	2.5	2.4	6.1	0.068	108
AMGA-160LB-04	15	1455	30 –	28	90.7	90.8	2	0.85	HS 4	2.9	2.3	6.2	0.092	130
AMGA-180MB-04	18.5	1465	35.5 –	34	91.3	91.3	2	0.86	DS 5	2.9	2.6	6.8	0.13	162
AMGA-180LB-04	22	1465	42 –	40	91.9	91.9	2	0.86	DS 5	2.9	2.5	6.7	0.16	176
AMGA-200LG-04	30	1465	57 –	53	92.5	92.6	2	0.87	HS 4	2.4	2.2	6.4	0.25	254
AMGA-225SE-04	37	1470	70 –	65	93	93	2	0.87	HS 4	2.2	2.2	6.3	0.35	305
AMGA-225ME-04	45	1475	87 –	83	93.2	93.1	2	0.84	HS 5	2.6	2.5	6.7	0.41	335
AMGA-250ME-04	55	1480	100 –	95	94.5	94.5	1	0.88	HS 5	2.4	2.9	7.6	0.80	425
AMGA-280SG-04	75	1480	137 –	125	94.7	94.7	1	0.88	HS 4	2.2	2.5	6.5	1.44	585
AMGA-280MG-04	90	1480	169 –	152	95	95	1	0.88	HS 4	2.3	2.5	6.5	1.65	660
AMGA-315SB-04	110	1485	205 –	195	95.2	95		0.85	DS 4	2.1	2.3	6.5	2.4	795
AMGA-315MB-04	132	1485	250 –	230	95.5	95.3		0.85	DS 4	2.1	2.3	6.5	2.9	890
AMGA-315MD-04	160	1485	300 –	275	95.6	95.5		0.86	DS 4	2.1	2.2	6.5	3.4	960
AMGA-315LB-04*	200	1485	375 –	345	95.7	95.6		0.85	DS 4	2.5	2.5	6.6	4.0	1165
AMGA-355MB-04	225	1488	420 –	385	96	95.8		0.85	DS 4	2.0	2.5	6.8	5.5	1520
AMGA-355MB-04*	250	1490	475 –	425	96	95.9		0.85	DS 4	2.0	2.5	6.9	5.5	1520
AMGA-355MB-04	250	1490	455 –	420	96.4	96.3		0.86	HS 2	1.2	2.3	6.9	5.5	1520
AMGA-355LB-04	270	1489	505 –	460	96.2	95.9		0.85	DS 4	2.1	2.5	7.0	6.8	1730
AMGA-355LB-04*	315	1489	590 –	530	96.4	96		0.85	DS 4	2.1	2.5	7.1	6.8	1730
AMGA-355LB-04	315	1491	570 –	530	96.6	96.4		0.86	HS 2	1.3	2.5	7.0	6.8	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

1 Explanations see "Efficiency marking"

For special design the motors of efficiency class 2 from 5.5 kW can be upgraded to efficiency class 1. [surcharge, inquiry]

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55

**Types: AMGA**

**Number of poles: 6**

**380–420V – 50 Hz**

Class F insulation, Utilization to B  
Outputs up to AMGA-315 MB  
in accordance with DIN EN 50347

Type	Rated output	Rated speed	Rated current at		Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Starting current	Net weight
			380V – 420V					with direct-on starting as a multiple of the		J		
	kW	min <sup>-1</sup>	A	A	%	cos $\varphi$		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 1000 min<sup>-1</sup></b>												
AMGA-090LX-06	0.75	900	2.2 –	2.3	68.3	0.76	HS 4	1.6	1.9	3.2	0.0036	22
AMGA-090LB-06	1.1	915	3.3 –	3.5	72	0.72	HS 4	2.0	2.3	3.3	0.0036	22
AMGA-100LB-06	1.5	940	4 –	4.4	76.4	0.7	HS 4	2.2	2.5	4.4	0.0086	35
AMGA-112MB-06	2.2	940	5.2 –	5.4	80	0.77	HS 3	1.7	2.0	4.2	0.014	38
AMGA-132SB-06	3	955	6.6 –	6.3	85.6	0.81	HS 4	2.2	2.7	6.0	0.033	59
AMGA-132MB-06	4	955	8.8 –	9.1	84.7	0.81	HS 4	2.3	2.6	5.5	0.033	67
AMGA-132MD-06	5.5	955	12.2 –	11.6	86	0.82	HS 5	2.6	2.6	6.0	0.045	72
AMGA-160MB-06	7.5	970	16.3 –	16	87.9	0.81	HS 5	2.4	2.8	7.0	0.100	108
AMGA-160LB-06	11	965	23 –	22	88.8	0.82	HS 5	2.4	2.8	6.4	0.134	130
AMGA-180LB-06	15	965	31 –	30.5	90	0.8	HS 4	1.6	2.6	5.5	0.13	176
AMGA-200LG-06	18.5	970	37.5 –	35	90.8	0.83	DS 4	2.2	2.0	5.0	0.33	262
AMGA-200LJ-06	22	965	45 –	43	90.9	0.81	DS 4	2.3	2.0	5.0	0.33	282
AMGA-225ME-06	30	975	59 –	57	91.8	0.83	DS 5	2.6	2.3	5.8	0.55	315
AMGA-250ME-06	37	985	75 –	76	92.5	0.8	DS 4	2.3	2.2	6.6	1.00	420
AMGA-280SG-06	45	985	85 –	78	93.3	0.87	DS 4	2.1	2.1	6.2	1.87	605
AMGA-280MG-06	55	985	104 –	96	93.4	0.86	DS 4	2.1	2.4	6.2	2.3	670
AMGA-315SB-06	75	990	142 –	131	94.6	0.85	DS 4	2.2	2.3	6.6	3.3	795
AMGA-315MB-06	90	990	168 –	154	94.8	0.86	DS 4	2.1	2.3	6.7	4.0	890
AMGA-315MC-06	110	990	205 –	118	95.2	0.87	DS 4	2.3	2.3	7.0	4.9	960
AMGA-315MD-06*	132	990	240 –	224	95.3	0.87	DS 4	2.4	2.2	6.9	4.9	960
AMGA-315LB-06	160	990	290 –	268	95.5	0.87	DS 4	2.4	2.3	7.0	6.0	1165
AMGA-355MB-06	200	993	370 –	350	96.1	0.85	HS 2	1.3	2.5	6.4	7.8	1520
AMGA-355LB-06	250	993	467 –	436	96.2	0.85	HS 2	1.1	2.5	6.3	8.9	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

## Loher "CHEMSTAR" motors, Series AMGK, Output tables

### Three-phase motors with squirrel cage

Totally enclosed fan-cooled, enclosure IP 55

Protection type "n"

Types: AMGK

Number of poles: 2

**380–420V – 50 Hz**

Class F insulation, Utilization to B

Outputs up to AMGK-315 MB

in accordance with DIN EN 50347

Type	Rated output	Rated speed	Rated current at	Efficiency 4/4 $\eta$	Efficiency 3/4 $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
			380V – 420V A	%	%	$\cos\varphi$		with direct-on starting as a multiple of the rated torque	rated torque	rated current	approx. $\text{kgm}^2$	approx. kg
	kW	$\text{min}^{-1}$						$M_A/M_N$	$M_K/M_N$	$I_A/I_N$		

### Speed 3000 $\text{min}^{-1}$

AMGK-090LX-02	1.5	2835	3.3	78.4	77	0.88	HS 5	2.5	2.7	5.7	0.002	22
AMGK-090LB-02	2.2	2850	4.7	81.7	80	0.88	HS 5	2.9	3.0	6.3	0.002	22
AMGK-100LB-02	3	2880	6.3	84.2	83	0.88	HS 5	2.7	3.0	6.7	0.0039	35
AMGK-112MB-02	4	2880	7.8	85.5	84	0.92	HS 5	2.9	3.5	6.9	0.006	38
AMGK-132SB-02	5.5	2900	10.9	86.5	85.5	0.88	HS 5	3.0	3.3	6.5	0.011	53
AMGK-132SD-02	7.5	2910	14.6	88	87	0.88	HS 5	3.4	3.8	7.3	0.014	56
AMGK-160MB-02	11	2920	22	88.5	88.2	0.87	HS 5	2.7	2.9	5.7	0.0364	104
AMGK-160MD-02	15	2920	29	90	89.5	0.89	HS 5	2.7	3.0	5.8	0.045	106
AMGK-160LB-02	18.5	2920	34.5	91	90	0.90	HS 5	2.9	3.0	6.1	0.057	130
AMGK-180MB-02	22	2950	42	91	90	0.87	HS 5	2.2	3.0	6.9	0.094	162
AMGK-200LG-02	30	2960	54	92.5	91	0.91	HS 4	2.4	2.6	7.1	0.182	252
AMGK-200LJ-02	37	2955	67	93	92	0.90	HS 4	2.6	2.8	7.3	0.200	262
AMGK-225ME-02	45	2965	82	93.5	92.5	0.89	HS 5	2.2	2.7	6.8	0.247	305
AMGK-250ME-02	55	2975	101	94.1	93.2	0.86	HS 5	2.3	3.2	7.3	0.45	410
AMGK-280SG-02	75	2980	132	94.7	94	0.90	HS 4	2.2	2.2	6.6	0.88	555
AMGK-280MG-02	90	2975	160	95	94.5	0.90	HS 4	2.0	2.2	6.3	1.03	590
AMGK-315SB-02 <sup>1</sup>	110	2975	198	95	94.5	0.89	DS 4	2.0	2.4	6.3	1.61	735
AMGK-315MB-02 <sup>1</sup>	132	2980	240	95.5	95	0.89	DS 4	2.0	2.5	6.1	1.91	835
AMGK-315MD-02 <sup>1</sup>	160	2980	285	95.8	95.2	0.89	DS 4	2.3	2.6	6.5	2.3	905
AMGK-315LB-02 <sup>*1</sup>	200	2980	355	96	95.6	0.90	DS 4	2.5	2.7	6.5	2.8	1085
AMGK-355MB-02	250	2980	450	96	95.6	0.89	DS 4	2.0	2.5	6.5	3.8	1360
AMGK-355LB-02*	315	2985	560	96.4	96	0.89	DS 4	2.2	2.7	6.8	4.7	1580

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

<sup>1</sup> Type AMGK-315

We reserve us the right to deliver foot-mounted types (AMSK) in welded design.

(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection type “n”

**Types: AMGK**

**Number of poles: 4**

**380–420V – 50 Hz**  
Class F insulation, Utilization to B  
Outputs up to AMGK-315 MB  
in accordance with DIN EN 50347

Type	Rated output	Rated speed	Rated current at	Efficiency 4/4 $\eta$	Efficiency 3/4 $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
			380V – 420V A	%	%	$\cos\varphi$		with direct-on starting as a multiple of the				
	kW	$\text{min}^{-1}$						rated torque $M_A/M_N$	rated torque $M_K/M_N$	rated current $I_A/I_N$	approx. $\text{kgm}^2$	approx. kg
<b>Speed 1500 <math>\text{min}^{-1}</math></b>												
AMGK-090LX-04	1.1	1400	2.75	77	77	0.83	HS 4	2.1	2.3	4.9	0.0036	22
AMGK-090LB-04	1.5	1410	3.45	79	79	0.83	HS 5	2.5	2.7	5.0	0.0036	22
AMGK-100LB-04	2.2	1400	4.95	81	81	0.84	HS 5	2.2	2.5	5.1	0.0051	35
AMGK-100LD-04	3	1410	6.7	82.6	82.5	0.82	HS 5	2.5	2.7	5.7	0.0066	38
AMGK-112MB-04	4	1415	8.6	84	84	0.84	HS 5	2.2	2.6	5.7	0.012	41
AMGK-132SB-04	5.5	1440	11	87	87	0.85	HS 5	2.3	2.7	6.4	0.022	59
AMGK-132MB-04	7.5	1445	15	88	88	0.85	HS 5	2.6	3.0	7.2	0.030	69
AMGK-160MB-04	11	1460	21.5	90	90	0.84	HS 5	2.5	2.4	6.0	0.068	108
AMGK-160LB-04	15	1455	31.5	90.7	90.8	0.85	HS 4	2.9	2.3	5.7	0.092	130
AMGK-180MB-04	18.5	1465	36	91.3	91.3	0.86	DS 5	2.9	2.6	6.5	0.13	162
AMGK-180LB-04	22	1465	42	91.9	91.9	0.86	DS 5	2.9	2.5	6.5	0.16	176
AMGK-200LG-04	30	1465	57	92.5	92.6	0.87	HS 4	2.4	2.2	6.2	0.25	254
AMGK-225SE-04	37	1470	70	93	93	0.87	HS 4	2.2	2.2	6.1	0.35	305
AMGK-225ME-04	45	1475	86	93.2	93.1	0.84	HS 5	2.6	2.5	6.5	0.41	335
AMGK-250ME-04	55	1480	100	94.5	94.5	0.88	HS 5	2.4	2.9	7.4	0.80	425
AMGK-280SG-04	75	1480	137	94.7	94.7	0.88	HS 4	2.2	2.5	6.3	1.44	585
AMGK-280MG-04	90	1480	165	95	95	0.88	HS 4	2.3	2.5	6.2	1.65	660
AMGK-315SB-04	110	1485	205	95.2	95	0.85	DS 4	2.1	2.3	6.3	2.4	795
AMGK-315MB-04	132	1485	250	95.5	95.3	0.85	DS 4	2.1	2.3	6.2	2.9	890
AMGK-315MD-04	160	1485	300	95.6	95.5	0.86	DS 4	2.1	2.2	6.2	3.4	960
AMGK-315LB-04*	200	1485	370	95.7	95.6	0.85	DS 4	2.5	2.5	6.3	4.0	1165
AMGK-355MB-04	225	1488	420	96	95.8	0.85	DS 4	2.0	2.5	6.5	5.5	1520
AMGK-355MB-04	250	1490	455	96.4	96.3	0.86	HS 2	1.2	2.3	6.6	5.5	1520
AMGK-355LB-04	270	1489	505	96.2	95.9	0.85	DS 4	2.1	2.5	6.7	6.8	1730
AMGK-355LB-04	315	1491	570	96.6	96.4	0.86	HS 2	1.3	2.5	6.7	6.8	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

1 Explanations see “Efficiency marking”

For special design the motors of efficiency class 2 from 5.5 kW can be upgraded to efficiency class 1. [surcharge, inquiry]

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection type “n”

**Types: AMGK**

**Number of poles: 6**

**380–420V – 50 Hz**  
Class F insulation, Utilization to B  
Outputs up to AMGK-315 MB  
in accordance with DIN EN 50347

Type	Rated output	Rated speed	Rated current at	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
			380 V – 420 V				with direct-on starting as a multiple of the				
	kW	min <sup>-1</sup>	A	%	cos $\varphi$		rated torque M <sub>A</sub> /M <sub>N</sub>	rated torque M <sub>K</sub> /M <sub>N</sub>	rated current I <sub>A</sub> /I <sub>N</sub>	approx. kgm <sup>2</sup>	approx. kg

#### Speed 1000 min<sup>-1</sup>

AMGK-090LX-06	0.75	900	2.3	68.3	0.76	HS 4	1.6	1.9	3.1	0.0036	22
AMGK-090LB-06	1.1	915	3.5	72	0.72	HS 4	2.0	2.3	3.1	0.0036	22
AMGK-100LB-06	1.5	940	4.4	76.4	0.7	HS 4	2.2	2.5	4.2	0.0086	35
AMGK-112MB-06	2.2	940	5.4	80	0.77	HS 3	1.7	2.0	4.1	0.014	38
AMGK-132SB-06	3	955	6.6	85.6	0.81	HS 4	2.2	2.7	5.7	0.030	59
AMGK-132MB-06	4	955	9.1	84.7	0.81	HS 4	2.3	2.6	5.3	0.033	67
AMGK-132MD-06	5.5	955	12.2	86	0.82	HS 5	2.6	2.6	5.8	0.045	72
AMGK-160MB-06	7.5	970	16.3	87.9	0.81	HS 5	2.4	2.8	6.9	0.100	108
AMGK-160LB-06	11	965	23	88.8	0.82	HS 5	2.4	2.8	6.3	0.134	130
AMGK-180LB-06	15	965	31	90	0.8	HS 4	1.6	2.6	5.4	0.13	176
AMGK-200LG-06	18.5	970	37.5	90.8	0.83	DS 4	2.2	2.0	4.8	0.33	262
AMGK-200LJ-06	22	965	47	90.9	0.81	DS 4	2.3	2.0	4.7	0.33	282
AMGK-225ME-06	30	975	60	91.8	0.83	DS 5	2.6	2.3	5.6	0.55	315
AMGK-250ME-06	37	985	76	92.5	0.8	DS 4	2.3	2.2	6.3	1.00	420
AMGK-280SG-06	45	985	86	93.3	0.87	DS 4	2.1	2.1	5.8	1.87	605
AMGK-280MG-06	55	985	105	93.4	0.86	DS 4	2.1	2.4	5.9	2.3	670
AMGK-315SB-06	75	990	142	94.6	0.85	DS 4	2.2	2.3	6.3	3.3	795
AMGK-315MB-06	90	990	170	94.8	0.86	DS 4	2.1	2.3	6.3	4.0	890
AMGK-315MC-06	110	990	200	95.2	0.87	DS 4	2.3	2.3	6.8	4.9	960
AMGK-315MD-06*	132	990	240	95.3	0.87	DS 4	2.4	2.2	6.6	4.9	960
AMGK-315LB-06	160	990	290	95.5	0.87	DS 4	2.4	2.3	6.7	6.0	1165
AMGK-355MB-06	200	993	370	96.1	0.85	HS 2	1.3	2.5	6.2	7.8	1520
AMGK-355LB-06	250	993	467	96.2	0.85	HS 2	1.1	2.5	6.0	8.9	1730

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.



## Loher "CHEMSTAR" motors, Series EMGV, Output tables

### Three-phase motors with squirrel cage

Totally enclosed fan-cooled, enclosure IP 55

Protection type "Increased Safety" EEx e II

Types: EMGV

Number of poles: 2

380–420V – 50 Hz

Class F insulation, Utilization to B

Temperature class T3

Type	Rated output	Rated speed	Rated current at 380V to 420V	Efficiency	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque rated torque	Starting current rated current	Time of temperature rise $t_E$ T3	Moment of inertia $J_M$	Weight
	kW	min <sup>-1</sup>	A	%	cos $\varphi$		$M_A/M_N$	$M_K/M_N$	$I_A/I_N$	sec.	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 3000 min<sup>-1</sup></b>												
EMGV-090LX-02	1.3	2860	2.85	80	0.86	HS 5	3.1	3.3	6.8	10	0.0020	22
EMGV-090LB-02	1.85	2850	3.85	82	0.86	HS 5	3.1	3.2	7.5	8	0.0020	22
EMGV-100LB-02	2.5	2875	5.1	83.5	0.90	HS 4	2.2	2.5	6.8	10	0.0039	35
EMGV-112MD-02	3.3	2880	6.2	86	0.94	HS 4	2.4	3.2	7.1	14	0.0075	38
EMGV-132SD-02	4.6	2910	8.8	87.9	0.90	HS 5	2.7	3.2	7.0	9	0.014	56
EMGV-132SX-02	5.5	2910	10.6	88.6	0.88	HS 5	2.9	3.2	7.3	7	0.015	60
EMGV-160MB-02	7.5	2940	14.6	90.1	0.88	HS 5	3.0	3.2	6.8	13	0.0364	104
EMGV-160MD-02	10	2945	18.5	91.1	0.89	HS 4	2.0	2.8	6.5	16	0.045	106
EMGV-160LB-02	12.5	2945	23.5	91.9	0.88	HS 4	2.2	3.0	6.6	13	0.057	130
EMGV-180MB-02	15	2950	29	89	0.88	HS 4	1.9	2.5	6.3	14	0.094	162
EMGV-200LG-02	20	2965	39	91	0.86	HS 3	1.6	3.3	6.9	16	0.182	252
EMGV-200LJ-02	24	2960	45	92.9	0.87	HS 3	1.3	2.8	6.6	19	0.200	262
EMGV-225MB-02	28	2970	51	93.1	0.90	HS 4	2.1	2.5	6.9	9	0.247	305
EMGV-250MB-02	36	2970	64	94	0.91	HS 2	1.2	2.6	6.0	14	0.45	410
EMGV-280SG-02	47	2980	85	92.9	0.91	HS 2	1.5	2.7	7.0	12	0.88	555
EMGV-280MG-02	58	2980	102	94.6	0.92	HS 2	1.3	2.4	6.7	11	1.03	590
EMGV-315SA-02 <sup>1</sup>	68	2987	121	94.8	0.90	HS 2	1.1	2.6	6.4	25	1.61	735
EMGV-315SB-02 <sup>1</sup>	80	2987	142	94.8	0.90	HS 2	1.1	2.5	6.4	24	1.61	735
EMGV-315MB-02 <sup>1</sup>	100	2988	176	95.6	0.90	HS 2	1.1	2.5	6.8	20	1.91	835
EMGV-315MD-02 <sup>1</sup>	130	2985	220	95.9	0.93	HS 2	0.8	1.8	5.7	16	2.30	905
EMGV-315LB-02 <sup>1</sup>	150	2984	255	96	0.92	HS 2	1.0	2.4	6.2	13	2.80	1085
EMGV-355MB-02	185	2985	320	96	0.91	HS 2	0.9	2.3	6.3	14	2.60	1570
EMGV-355LB-02	220	2982	380	96.1	0.92	HS 2	1.2	2.6	5.7	13	3.16	1820

Higher outputs, other voltages and frequencies on request.

For motors still uncertified by the PTB modifications are possible.

<sup>1</sup> Type EMGV-315

We reserve us the right to deliver foot-mounted types (E.SV) in welded design.

(Additional weight approx. 80 kg acc. to quotation and order confirmation respectively).

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
 Protection type "Increased Safety" EEx e II

**380–420V – 50 Hz**  
 Class F insulation, Utilization to B  
 Temperature class T3

**Types: EMGV**

**Number of poles: 4**

Type	Rated output	Rated speed	Rated current at 380V to 420V	Efficiency	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque rated torque	Starting current rated current	Time of temperature rise t <sub>E</sub> T3	Moment of inertia J <sub>M</sub>	Weight
	kW	min <sup>-1</sup>	A	%	cosψ		M <sub>A</sub> /M <sub>N</sub>	M <sub>K</sub> /M <sub>N</sub>	I <sub>A</sub> /I <sub>N</sub>	sec.	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 1500 min<sup>-1</sup></b>												
EMGV-090LX-04	1.0	1410	2.4	75.2	0.83	HS 5	2.5	2.7	5.2	13	0.0036	22
EMGV-090LB-04	1.35	1425	3.25	78	0.79	HS 5	2.6	3.0	6.1	10	0.0036	22
EMGV-100LB-04	2.0	1410	4.55	80	0.82	HS 5	2.3	2.7	5.4	13	0.0051	35
EMGV-100LD-04	2.5	1410	5.6	81	0.83	HS 5	2.5	2.6	5.8	10	0.0066	38
EMGV-112MB-04	3.6	1425	7.7	84.3	0.82	HS 4	2.4	2.7	6.5	10	0.012	41
EMGV-132SB-04	5.0	1445	10.1	87.2	0.85	HS 5	2.4	2.5	7.0	12	0.022	59
EMGV-132MB-04	6.8	1440	13.7	88	0.86	HS 5	2.5	2.5	6.9	9	0.030	69
EMGV-160MB-04	10	1463	20.5	90.4	0.83	HS 4	2.1	3.1	7.5	11	0.068	108
EMGV-160LB-04	13.5	1460	27	91.2	0.84	HS 4	2.2	3.2	7.3	10	0.092	130
EMGV-180MB-04	15	1463	29	91.4	0.85	HS 4	2.1	3.0	6.8	11	0.13	162
EMGV-180LB-04	17.5	1465	32.5	91.8	0.88	HS 4	2.1	3.2	7.1	10	0.16	176
EMGV-200LG-04	24	1475	46.5	92.7	0.83	HS 4	2.0	3.5	7.6	13	0.25	254
EMGV-225SB-04	30	1478	57	93.5	0.84	HS 4	2.2	2.9	6.8	8	0.37	305
EMGV-225MB-04	36	1480	69	93.7	0.83	HS 4	2.1	2.8	7.2	8	0.44	335
EMGV-250MB-04	44	1490	81	94.8	0.85	SHS	1.4	2.6	7.1	14	0.80	425
EMGV-280SG-04	58	1490	111	94.8	0.82	HS 3	1.8	2.4	7.3	9	1.43	575
EMGV-280MG-04	70	1488	120	94.9	0.94	SHS	1.4	2.9	7.1	12	1.65	650
EMGV-315SB-04	90	1490	165	95.8	0.86	HS 2	1.0	2.4	6.2	12	2.34	795
EMGV-315MB-04	100	1489	186	95.8	0.85	HS 2	1.0	2.3	6.1	11	2.8	890
EMGV-315MD-04	125	1490	235	95.8	0.84	HS 2	1.1	2.3	5.9	12	3.3	960
EMGV-315LB-04	140	1490	255	96.1	0.86	HS 2	1.2	2.3	6.8	10	3.9	1165
EMGV-355MB-04	185	1491	345	96.1	0.84	HS 2	1.0	2.3	5.7	11	5.5	1650
EMGV-355LB-04	220	1492	405	96.3	0.84	HS 2	0.9	2.3	6.6	9	6.8	1885

Higher outputs, other voltages and frequencies on request.

For motors still uncertified by the PTB modifications are possible.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
Protection type "Increased Safety" EEx e II

**380–420V – 50 Hz**  
Class F insulation, Utilization to B  
**Temperature class T3**

**Types: EMGV**

**Number of poles: 6**

Type	Rated output	Rated speed	Rated current at 380V to 420V	Efficiency	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque rated torque	Starting current rated current	Time of temperature rise $t_E$ T3	Moment of inertia $J_M$	Weight
	kW	min <sup>-1</sup>	A	%	cos $\varphi$		$M_A/M_N$	$M_K/M_N$	$I_A/I_N$	sec.	approx. kgm <sup>2</sup>	approx. kg
<b>Speed 1000 min<sup>-1</sup></b>												
EMGV-090LX-06	0.65	890	1.84	66	0.79	HS 3	1.7	1.8	3.3	30	0.0036	22
EMGV-090LB-06*	0.95	900	2.7	68	0.77	HS 4	1.8	2.0	3.7	20	0.0036	22
EMGV-100LB-06	1.3	955	3.8	76	0.70	HS 4	2.4	2.7	4.8	24	0.0086	35
EMGV-112MB-06	1.9	945	4.6	80.3	0.75	HS 4	1.8	2.0	4.4	30	0.014	38
EMGV-132SB-06	2.6	965	5.7	84.5	0.81	HS 5	2.5	2.5	6.2	30	0.030	59
EMGV-132MB-06	3.5	955	7.6	84.7	0.81	HS 4	2.5	2.6	5.8	23	0.033	67
EMGV-132MD-06	4.8	955	10.4	86	0.80	HS 5	2.5	2.8	6.3	17	0.045	72
EMGV-160MB-06	6.6	965	13.9	87.2	0.81	HS 5	2.5	2.8	6.7	12	0.100	108
EMGV-160LB-06	9.7	970	19.8	88.6	0.82	HS 5	2.4	3.0	7.5	9	0.134	130
EMGV-180LB-06	13.2	970	28	89.8	0.77	HS 4	2.1	2.9	5.8	16	0.13	176
EMGV-200LG-06	16.5	980	33	91.1	0.83	HS 4	2.2	2.8	6.5	17	0.33	262
EMGV-200LJ-06	20	980	40.5	91.5	0.80	HS 5	2.4	2.8	6.7	11	0.33	282
EMGV-225MB-06	27	990	54	93	0.79	SHS	1.8	2.8	7.5	15	0.55	315
EMGV-250MB-06	33	985	64	92.7	0.83	SHS	1.7	2.6	6.2	10	1.1	420
EMGV-280SG-06	40	985	74	93	0.86	DS 4	2.2	2.2	6.0	10	2.3	605
EMGV-280MG-06	46	985	85	93.3	0.88	DS 4	2.2	2.5	6.4	9	2.9	715
EMGV-315SB-06	64	990	120	95.5	0.88	HS 2	1.2	2.3	5.9	18	2.7	795
EMGV-315MB-06	76	991	140	95.3	0.86	HS 2	1.2	2.3	5.8	24	3.2	890
EMGV-315MC-06	85	992	156	95.6	0.86	HS 2	1.3	2.3	5.8	13	3.8	960
EMGV-315MD-06	105	991	195	95.5	0.86	HS 2	1.3	2.3	6.0	10	3.8	960
EMGV-315LB-06	130	990	235	95.8	0.87	HS 2	1.3	2.3	6.2	9	4.7	1165
EMGV-355MB-06	170	993	310	96.1	0.87	HS 2	1.0	2.2	5.7	11	7.8	1740
EMGV-355LB-06	200	993	360	96.2	0.87	HS 2	1.0	2.2	6.0	10	9.1	1940

Higher outputs, other voltages and frequencies on request.

For motors still uncertified by the PTB modifications are possible.

\* Utilization to insulation class F.

## Loher "CHEMSTAR" motors, Series DN..., Output tables

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
**Protection type "Flameproof Enclosure" EEx de IIC**  
**Types: DNGW / DNSW      Number of poles: 2**

**380V–420V – 50 Hz**  
 Class F insulation, Utilization to B  
**Temperature class T4**

Type	Rated output	Rated speed	Rated current at 380 to 420V	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque with direct-on starting as a multiple of the rated torque	Starting current rated current	Moment of inertia J	Net weight
	kW	1/min	A	%	cos $\varphi$		$M_A/M_N$	$M_K/M_N$	$I_A/I_N$	kg m <sup>2</sup>	approx. kg
<b>Speed 3000 min<sup>-1</sup></b>											
DNGW-071BG-02	0.37	2770	1.05	66	0.83	HS 5	2.6	2.7	4.6	0.0003	12
DNGW-071BH-02	0.55	2765	1.4	69	0.86	HS 5	2.5	2.7	4.6	0.0004	13
DNGW-080BG-02	0.75	2820	1.86	76	0.83	HS 5	2.9	2.9	5.6	0.0006	20
DNGW-080BH-02	1.1	2800	2.60	77	0.84	HS 5	3.1	3.0	5.3	0.0008	22
DNGW-090LX-02	1.5	2835	3.3	78.4	0.88	HS 5	2.5	2.7	5.7	0.0020	32
DNGW-090LD-02	2.2	2850	4.7	81.3	0.88	HS 5	2.9	3.0	6.3	0.0020	32
DNGW-100LB-02	3.0	2880	6.3	84.2	0.88	HS 5	2.7	3.0	6.7	0.0039	37
DNGW-112MB-02	4.0	2880	7.8	85.5	0.92	HS 5	2.9	3.5	6.9	0.0060	55
DNGW-132SL-02	5.5	2900	10.9	86.5	0.88	HS 5	3.0	3.3	6.5	0.0110	85
DNGW-132SN-02	7.5	2910	14.6	88	0.88	HS 5	3.4	3.8	7.3	0.0140	90
DNGW-160ML-02	11	2920	22	88.5	0.87	HS 5	2.7	2.9	5.7	0.0364	150
DNGW-160MN-02	15	2920	29	90	0.89	HS 5	2.7	3.0	5.8	0.045	155
DNGW-160LL-02	18.5	2920	34.5	91	0.90	HS 5	2.9	3.0	6.1	0.057	170
DNGW-180MB-02	22	2950	42	91	0.87	HS 5	2.2	3.0	6.9	0.094	190
DNGW-200LB-02	30	2960	54	92.5	0.91	HS 4	2.4	2.6	7.1	0.182	310
DNGW-200LD-02	37	2955	67	93	0.90	HS 4	2.6	2.8	7.3	0.20	325
DNGW-225MB-02	45	2965	82	93.5	0.89	HS 5	2.2	2.7	6.8	0.247	375
DNGW-250MB-02	55	2975	101	94.1	0.86	HS 5	2.3	3.2	7.3	0.45	500
DNGW-280SG-02	75	2980	134	94.7	0.89	HS 4	2.2	2.2	6.6	0.88	725
DNGW-280MG-02	90	2975	160	95	0.90	HS 4	2.0	2.2	6.3	1.03	775
DNSW-315SB-02	110	2975	198	95	0.89	DS 4	2.0	2.4	6.3	1.61	950
DNSW-315MB-02	132	2980	240	95.5	0.89	DS 4	2.0	2.4	6.1	1.91	1030
DNSW-315MD-02	160	2980	285	95.8	0.89	DS 4	2.3	2.6	6.5	2.3	1100
DNSW-315LB-02	200	2980	355	96	0.90	DS 4	2.5	2.7	6.5	2.8	1350

Higher outputs, other voltages and frequencies on request.  
 Temperature classes T5 and T6 on request.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**  
**Types: DNGW / DNSW      Number of poles: 4**

**380V–420V – 50 Hz**  
Class F insulation, Utilization to B  
**Temperature class T4**

Type	Rated output	Rated speed	Rated current at 380 to 420V	Efficiency $\eta$	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the rated torque	Breakd. torque with direct-on starting as a multiple of the rated torque	Starting current with direct-on starting as a multiple of the rated current	Moment of inertia J	Net weight
	kW	1/min	A	%	$\cos \varphi$		$M_A/M_N$	$M_K/M_N$	$I_A/I_N$	kg m <sup>2</sup>	approx. kg
<b>Speed 1500 min<sup>-1</sup></b>											
DNGW-071BG-04	0.25	1350	0.78	60	0.78	HS 4	2.4	2.4	3.6	0.0007	12
DNGW-071BH-04	0.37	1360	1.11	65	0.77	HS 5	2.5	2.5	3.6	0.0009	13
DNGW-080BG-04	0.55	1400	1.60	70	0.77	HS 4	2.1	2.3	3.8	0.0015	20
DNGW-080BH-04	0.75	1380	2.05	73	0.79	HS 4	2.0	2.1	3.6	0.0020	22
DNGW-090LX-04	1.1	1400	2.75	77	0.83	HS 4	2.1	2.3	4.9	0.0036	32
DNGW-090LD-04	1.5	1410	3.45	79	0.83	HS 5	2.5	2.7	5.0	0.0036	32
DNGW-100LB-04	2.2	1400	4.95	81	0.84	HS 5	2.2	2.5	5.1	0.0051	37
DNGW-100LD-04	3.0	1410	6.7	82.6	0.82	HS 5	2.5	2.7	5.7	0.0066	40
DNGW-112MB-04	4.0	1415	8.6	84	0.84	HS 5	2.2	2.6	5.7	0.012	57
DNGW-132SL-04	5.5	1440	11	87	0.85	HS 5	2.3	2.7	6.4	0.022	85
DNGW-132ML-04	7.5	1445	15.3	88	0.85	HS 5	2.6	3.0	7.1	0.030	100
DNGW-160ML-04	11	1460	21.5	90	0.84	HS 5	2.5	2.4	6.0	0.068	150
DNGW-160LL-04	15	1455	31.5	90.7	0.85	HS 4	2.9	2.3	5.7	0.092	180
DNGW-180MB-04	18.5	1465	36	91.3	0.86	DS 5	2.9	2.6	6.5	0.13	190
DNGW-180LB-04	22	1465	42	91.9	0.86	DS 5	2.9	2.5	6.5	0.16	210
DNGW-200LB-04	30	1465	57	92.5	0.87	HS 4	2.4	2.2	6.2	0.25	310
DNGW-225SB-04	37	1470	70	93	0.87	HS 4	2.2	2.2	6.1	0.35	360
DNGW-225MB-04	45	1475	86	93.2	0.84	HS 5	2.6	2.5	6.5	0.41	400
DNGW-250MB-04	55	1480	100	94.5	0.88	HS 5	2.4	2.9	7.4	0.80	510
DNGW-280SG-04	75	1480	139	94.7	0.88	HS 4	2.2	2.5	6.2	1.44	750
DNGW-280MG-04	90	1480	165	95	0.88	HS 4	2.3	2.5	6.2	1.65	800
DNSW-315SB-04	110	1485	205	95.2	0.85	DS 4	2.1	2.3	6.3	2.4	980
DNSW-315MB-04	132	1485	250	95.5	0.85	DS 4	2.1	2.3	6.2	2.9	1050
DNSW-315MD-04	160	1485	300	95.6	0.86	DS 4	2.1	2.2	6.2	3.4	1120
DNSW-315LB-04	200	1485	370	95.7	0.85	DS 4	2.5	2.5	6.3	4.0	1350

Higher outputs, other voltages and frequencies on request.  
Temperature classes T5 and T6 on request.

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure” EEx de IIC**

**380V–420V – 50 Hz**  
 Class F insulation, Utilization to B  
**Temperature class T4**

**Types: DNGW / DNSW      Number of poles: 6**

Type	Rated output	Rated speed	Rated current at 380 to 420V	Efficiency $\eta$	Power factor	Rotor class	Starting torque	Breakd. torque with direct-on starting as a multiple of the rated torque	Starting current as a multiple of the rated current	Moment of inertia J	Net weight
	kW	1/min	A	%	$\cos \varphi$		$M_A/M_N$	$M_K/M_N$	$I_A/I_N$	kg m <sup>2</sup>	approx. kg
<b>Speed 1000 min<sup>-1</sup></b>											
DNGW-071BH-06	0.25	870	0.89	59	0.71	HS 4	2.0	1.8	2.6	0.0009	15
DNGW-080BG-06	0.37	895	1.30	64	0.71	HS 4	2.0	2.1	3.1	0.0015	20
DNGW-080BH-06	0.55	850	1.75	65	0.72	HS 4	2.0	2.1	3.1	0.0020	22
DNGW-090LX-06	0.75	900	2.3	68.3	0.76	HS 4	1.6	1.9	3.1	0.0036	30
DNGW-090LD-06	1.1	915	3.5	72	0.72	HS 4	2.0	2.3	3.1	0.0036	30
DNGW-100LB-06	1.5	940	4.4	76.4	0.70	HS 4	2.2	2.5	4.2	0.0086	40
DNGW-112MB-06	2.2	940	5.4	80	0.77	HS 3	1.7	2.0	4.1	0.014	60
DNGW-132SL-06	3.0	955	6.6	85.6	0.81	HS 4	2.2	2.7	5.7	0.030	85
DNGW-132ML-06	4.0	955	9.1	84.7	0.81	HS 4	2.3	2.6	5.3	0.033	90
DNGW-132MN-06	5.5	955	12.2	86	0.82	HS 5	2.6	2.6	5.8	0.045	95
DNGW-160ML-06	7.5	970	16.3	87.9	0.81	HS 5	2.4	2.8	6.9	0.100	150
DNGW-160LL-06	11	965	23	88.8	0.82	HS 5	2.4	2.8	6.3	0.134	180
DNGW-180LB-06	15	965	31	90	0.80	HS 4	1.6	2.6	5.4	0.13	210
DNGW-200LB-06	18.5	970	38	90.8	0.83	DS 4	2.2	2.0	4.8	0.33	320
DNGW-200LD-06	22	965	47	90.9	0.81	DS 4	2.3	2.0	4.7	0.33	330
DNGW-225MB-06	30	975	60	91.8	0.83	DS 5	2.6	2.3	5.6	0.55	385
DNGW-250MB-06	37	985	76	92.5	0.80	DS 4	2.3	2.2	6.3	1.00	510
DNGW-280SG-06	45	985	86	93.3	0.87	DS 4	2.1	2.1	5.8	1.87	750
DNGW-280MG-06	55	985	105	93.4	0.86	DS 4	2.1	2.4	5.9	2.3	800
DNSW-315SB-06	75	990	142	94.6	0.85	DS 4	2.2	2.3	6.3	3.3	980
DNSW-315MB-06	90	990	170	94.8	0.86	DS 4	2.1	2.3	6.3	4.0	1050
DNSW-315MC-06	110	990	200	95.2	0.87	DS 4	2.3	2.3	6.8	4.9	1150
DNSW-315MD-06	132	990	240	95.3	0.87	DS 4	2.4	2.2	6.6	4.9	1150
DNSW-315LB-06	160	990	290	95.5	0.87	DS 4	2.4	2.3	6.7	6.0	1400

Higher outputs, other voltages and frequencies on request.  
 Temperature classes T5 and T6 on request.

# Fire gas motors

High-temperature motors for operation in case of fire, certified to EN 12101-3

## The motors are suitable to be used as direct drive of smoke and heat exhaust ventilators.

Our complete high-temperature motor series, frame sizes 090 to 315, has been certified according to EN 12101-3.

This means for the purchaser:

- Cost advantage, since no additional certification of the complete installation is required when already certified ventilators are used.
- Flexibility, because our motors can be used without limitation in an already certified complete installation.
- Planning reliability, since our product also corresponds with future requirements.
- Improved marketability, since you acquire a reliable product which is in compliance with the legal provisions.
- Availability, since the entire series is already certified.
- Cost advantage, since no additional enclosure is necessary when the motor is operated within the certified temperature classes.
- Optimization of your product quality, because our motors represent the highest technological standards! (special ball bearings, greases, etc.)

## Performance data are important.

However of vital importance are the processing, the quality and the durability of all materials used in addition to the technical advantages of our products as to the output and efficiency of the fire gas motors.

That is why not only the customer, but also the legislator demands a continuous technological development, so that dangerous situations can be put under control in case of emergency. For decades Loher has been a worldwide leader in the field of high-temperature motors and has once again set new standards with an innovative product development.

## Worldwide application.

Loher products are in operation worldwide to protect people and technical installations.

Fire disasters show how important it is to use reliable and proven technical equipment. The safety, above all in public buildings, underlines the necessity of standardized directives in compliance with EN 12101-3.

Also abroad they trust in Loher's experience of many years and the technical know-how. Examples are the Loher motors used for tunnel ventilation in the Cairo underground network and in the Euro-Tunnel between France and England.

Class to EN 12101-3	Fire gas temperature °C	Minimum operating hours to EN 12101-3	Minimum operating hours of Loher motors
F 200	200	2h	3h
F 300	300	1h	1h
F 400	400	2h	3.5h

Type ANGA from-to	Requirement class up to 300°C Power (kW)* from-to	Speed (at 50 Hz)	Requirement class up to 400°C Power (kW)* from-to
090LA-02 – 315LB-02	1.5–200	3000 1/min	1.1–200
090LA-04 – 315LB-04	1.1–200	1500 1/min	0.75–200
090LA-06 – 315LB-06	0.75–160	1000 1/min	0.55–160
090LA-08 – 315LB-08	0.37–132	750 1/min	0.25–132
100LB-10 – 315LB-10	0.55–90	600 1/min	0.37–90
100LB-12 – 315LB-12	0.37–75	500 1/min	0.25–75

\* The power is calculated for fan operation (duty type S1) at a normal temperature up to max. 40°C

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## Designs

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### Standard design

- Voltage 400/690V
- Frequency 50 Hz
- Enclosure IP 55/56
- All standard mounting types.

For the application as fire gas motors the insulation system, the connections and bearings in the motors of the type series ANGA were modified to be used in accordance with the requirement classes.

- Frame + end shields: cast iron
- Bearings: Antifriction bearings with metal cage and high-temperature grease
- Connection of the motors:
  - Terminal box of cast iron suitable to connect a high-temperature resistant cable
  - Option:
    - Cable outlet (without terminal box) with high-temperature resistant cable connected in the motor

### Special designs (on request)

- Other voltages and frequencies
- Other outputs
- Special mounting types
- Motors for indirect driving of hot gas ventilators
- Increased fire gas temperature
- Without self-ventilation lying in the air flow
- Pole-changing
- Inverter operation (except in case of fire)



# Ship and marine motors, Output tables

## General

### Acceptance, in-process supervision, mechanical construction

#### Location

## General

For the application on ships the motors must meet special requirements. These are specified in the "Rules for drive systems on ships" of the different classification societies.

ABS	American Bureau of Shipping
USCG	US Coast guard
BV	Bureau Veritas
DNV	Det Norske Veritas
GL	Germanischer Lloyd
LRoS	Lloyd's Register of Shipping
R.I.Na	Registro Italiano Navale
RS	Russian Register of Shipping

Designs to other regulations are available on request. Additionally the motors are in accordance with the relevant DIN EN and IEC standards and regulations for rotating electrical machines. The motors are provided with the CE-marking in accordance with the Low Voltage Directive 89/9/EC.

## Acceptance, in-process supervision

Depending on the application of the motor the classification societies determine whether an "acceptance" or an "acceptance and in-process supervision" is required.

Acceptance: Electrical and mechanical test in the presence of an authorized representative of the classification society.

In-process supervision: In the single phases the motor manufacturing is subject to the supervision by an authorized representative of the classification society.

For motors which are subject to acceptance or acceptance and in-process supervision, this information and the application are to be stated in the order.

## Mechanical construction

The motors will be dimensioned and made in accordance with the "Rules for drive systems on ships" of the classification society/societies indicated in the order.

## Location / motor types

### Below deck mounting

Type	Frame size	Ex-protection	Enclosure	Housing material	Acceptance or in-process supervision by classification society
BNGA	071–200	without	IP55	Cast iron	Acceptance by GL
ANGA	090–355	without	IP55 option. IP56	Cast iron	according to the order
DN.W	071–315	II 2 G EEx d IIC	IP55 option. IP56	Cast iron	according to the order

## Bearings and greasing

### Resistance to shocks

### Terminal boxes

#### Upper deck mounting

Type	Frame size	Ex-protection	Enclosure	Housing material	Acceptance or in-process supervision by classification society
ANGA	090–355	without	IP56	Cast iron	according to the order
DNGW	071–315	II 2 G EEx d IIC	IP56	Cast iron	according to the order

#### Bearings and greasing

The standard motors are provided with axially preloaded deep groove ball bearings. For horizontal mounting arrangements the bearings are installed with an increased axial bearing preload to avoid bearing damages due to vibrations at standstill.

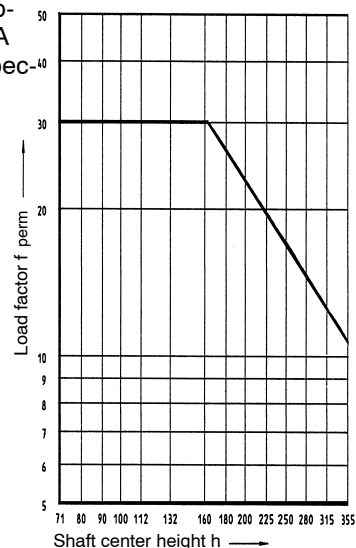
Up to including frame size 280 the bearings have permanent lubrication. From frame size 315 the motors are equipped with a regreasing device and grease regulation. For information on bearing size, additional radial and axial load at

the shaft end as well as grease life or relubrication intervals please see the tables of type series ANGA and DN.W in this technical list. For special drive conditions the application of cylinder roller bearings on the driving end is possible to take up higher radial forces.

#### Resistance to shocks

The maximum permissible values for the motors in this technical list are shown in the diagram below. The values  $f_{\text{permissible}}$  are multiples of the acceleration due to gravity ( $g \approx 9.81 \text{ m/s}^2$ ) related to the motor frame size  $h$  (shaft center height). The graph is valid with a safety factor of 1.0 for all mounting arrangements and shock effects. In the event of higher stresses, please contact us. Depending on the speed of the shock acceleration, special provisions will be necessary. For determination of the shock acceleration, in most cases the weight of the assembled unit, e.g. motor with driven machine, baseframe and coupling, is to be taken as a basis.

The motors are suitable to be applied at vibrations in the Zones A and C in accordance with the specifications of the Germanischer Lloyd, Rule "GL 2000".



#### Terminal boxes

The terminal boxes correspond with the enclosure of the motor, however IP55 at least. Single-speed motors are provided with 6 terminals for connection to the power supply. Additional terminals for a cross section of max.  $2.5 \text{ mm}^2$  are provided for the connection of space heater or winding temperature monitoring (e.g. PTC). For the type series ANGA and AMGK from frame size 090, for the

type series DN.W from frame size 132 the additional terminals can also be located in a separate terminal box.

The terminal boxes have metric entry threads in accordance with DIN 42925 (See motor dimension drawing for number and size). Cable glands do not belong to the delivery scope of the motor. Different entry threads or cable

glands to be supplied must be indicated in the order. For cable glands it must also be indicated whether those are required with or without braided shielding. Cable glands to DIN 89280 are exclusively available for motors without EEx-protection. For EEx-protected motors certified cable glands to directive 94/9/EC are required.

### Mechanical special designs

- Motors without terminal box with connecting cable radially led out
- Hoist drives with seawater-protected brake in enclosure IP67
- Inverter-controlled motors with mounted forced ventilation
- Motors with mounted pulse generator
- Larger protective hood against penetration of splash water into the fan

### Special design with reinforced fan and fan cowl

In motors for upper deck mounting operated in polar regions the self-ventilated fan of the motor can get frozen at standstill. When switching on the motor the fan can get damaged and thus the ventilating sys-

tem fails. Therefore Loher examined thoroughly the above mentioned extreme cases and their mechanical effect. Based on these findings a reinforced ventilating system was developed for the mo-

tors in "Flameproof enclosure". This ensures that a frozen fan is not damaged when the motor starts and the motor cooling is guaranteed.

### Space heater

As protection against the formation of condensed water the motors can be equipped with a space heater on request. This is especially important if moisture condensation

can occur due to strong temperature variations at standstill. The used strip-type heaters are available for a voltage from 110–120V or 210–250V. During operation the

space heater is not allowed to be switched on! See filament wattage on page 14.

### Painting

For the standard version the painting will be made with a polyurethane finishing coat in accordance with the Loher painting system.

Colour: RAL 7030 (stone grey)

Type ANGA: Painting N04  
 Layer thickness 40 mm  
 Type DN.W: Painting N08  
 Layer thickness 80 mm

Special painting with higher corrosion protection is available on request. Detailed information is indicated in the section "Painting".

### Electrical design

#### Coolant temperature

Classification society:	ABS	BV *	DNV	GL	LROs	RINA	RS
Coolant temperature [°C]:	50	50	45	45	45	50	45
Permissible temperature rise [K]:	70	70	70	75	70	70	75

\* Attention: For EEx e and EEx d double protection is mostly required.

### Motor protection

See section "Electrical design, general" in this technical list

### Marine motors for variable frequency

Variable frequency is an intentionally made frequency change in ship supply systems.

The frequency adjustment is made by changing the speed of the marine generator. With an adaptation to the actual power requirement the energy consumption of the ship's auxiliary drive systems can be reduced.

The voltage will change automatically by excitation of the synchronous generator and linear with the frequency.

The electric motors connected to this supply system will also be speed-controlled with  $U/f = \text{const.}$  like this is known from inverter operation.

A difference is that the marine generator supplies a pure sinusoidal, non-impulse commutated voltage. There are (apart from exceptions) ships with a supply system of 400V, 50 Hz and those with a supply system of 440V, 60 Hz.

In both cases the variable frequency is normally from 30 Hz to 60 Hz.

This results in the following variants:

Var.1:		
240V	400V	480V
30 Hz	50Hz	60Hz
P <sub>1.30</sub>	P <sub>1.50</sub>	P <sub>1.60</sub>

Var.2:		
220V		440V
30Hz		60Hz
P <sub>2.30</sub>		P <sub>2.60</sub>

If possible both variants have identical winding data, i.e. according to the standard motor, ensuring the interchangeability.

They are stamped according to 1) or to 2) considering the requested shipping classification.

Depending on the shipping classification and thermal class different temperature limits must be observed. Outputs and electrical data on request.

The outputs of an ANGA-250ME-04 according to GL for 45°C coolant temperature and Thermal class B (permissible: 75K temperature rise of the winding) are indicated as an example:

Var.1:		
240V	400V	480V
30Hz	50Hz	60Hz
P <sub>1.30</sub> =	P <sub>1.50</sub> =	P <sub>1.60</sub> =
31 KW	55KW	63.5KW

Var.2:		
220V		440V
30Hz		60Hz
P <sub>2.30</sub> =		P <sub>2.60</sub> =
29 KW		59.0KW

A rough approximation is to be:

$$P_{1.30} / P_{1.50} = 0.56$$

$$P_{2.30} / P_{1.30} = 0.93$$

$$P_{1.60} / P_{1.50} = 1.15$$

$$P_{2.60} / P_{1.60} = 0.93$$

...if the same winding is available for Variant 1 and 2.

## Ship and marine motors, Output tables

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55

**400V – 50 Hz**

**Types: ANGA      Number of poles: 2      – 50 Hz**

**Duty type S1**

Type	Rated output at permissible temperature rise and cooling air temperature															
	VDE	40°C	70K		75K		Rated speed	Rated current at	Efficiency 4/4	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia	Net weight
			ABS	50°C	GL	45°C										
			BV	50°C	RS	45°C										
			DNV	45°C												
			LRoS	45°C												
			RINA	50°C												

<sup>1</sup> Type ANGA-315  
We reserve us the right to deliver foot-mounted types (ANGA) in welded design.  
(Additional weight approx. 80 kg acc. to quotation and confirmation respectively).

Higher outputs, other duty types, pole numbers and pole-changing motors on request.  
Motors which have not yet been certified are subject to modifications.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55

**400V – 50 Hz**

**Types: ANGA      Number of poles: 4      – 50 Hz**

**Duty type S1**

Type	Rated output at permissible temperature rise and cooling air temperature														
	VDE 40°C	70K		75K		Rated speed	Rated current at	Efficiency 4/4	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia	Net weight
		ABS	50°C	GL	45°C										
		BV	50°C	RS	45°C										
		DNV	45°C												
		LROs	45°C												
		RINA	50°C												
					</										

Higher outputs, other duty types, pole numbers and pole-changing motors on request.  
Motors which have not yet been certified are subject to modifications.

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure”**  
**Frame sizes 071 to 315: EEx de IIC**

**400V – 50 Hz**

**Temperature class T4**

**Types: DNGW/DNSW      Number of poles: 2      – 50 Hz**

Type	Rated output at permissible temperature rise and cooling air temperature															
	VDE	40°C	70K ABS BV DNV LROs RINA	50°C 50°C 45°C 45°C 50°C	75K GL RS	45°C 45°C	Rated speed	Rated current at	Effi- ciency 4/4	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia	Net weight
												with direct-on starting as a multiple of the			J	
	kW		kW		kW		min <sup>-1</sup>	400V A	η %	cosφ		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
Speed 3000 min <sup>-1</sup>																
DNGW-071BH-02	0.55		0.55		0.55		2765	1.35	69	0.86	HS 5	2.5	2.7	4.8	0.0004	13
DNGW-080BH-02	1.1		1.1		1.1		2800	2.5	77	0.84	HS 5	3.1	3.0	5.5	0.0008	22
DNGW-090LD-02	2.2		2.0		2.1		2850	4.6	81.3	0.88	HS 5	2.9	3.0	6.4	0.0020	32
DNGW-100LB-02	3.0		2.8		3.0		2880	6.0	84.2	0.88	HS 5	2.7	3.0	7.0	0.0039	37
DNGW-112MB-02	4.0		4.0		4.0		2880	7.5	85.5	0.92	HS 5	2.9	3.5	7.2	0.0060	55
DNGW-132SL-02	5.5		5.5		5.5		2900	10.6	86.5	0.88	HS 5	3.0	3.3	6.6	0.0110	85
DNGW-132SN-02	7.5		7.0		7.5		2910	14.5	88	0.88	HS 5	3.4	3.8	7.4	0.0140	90
DNGW-160ML-02	11		11		11		2920	21	88.5	0.87	HS 5	2.7	2.9	5.9	0.0364	150
DNGW-160MN-02	15		12.5		13.5		2920	28	90	0.89	HS 5	2.7	3.0	6.0	0.0445	155
DNGW-160LL-02	18.5		18		18.5		2920	33	91	0.90	HS 5	2.9	3.0	6.4	0.057	170
DNGW-180MB-02	22		22		22		2950	41.5	91	0.87	HS 5	2.2	3.0	7.0	0.094	190
DNGW-200LB-02	30		30		30		2960	52	92.5	0.91	HS 4	2.4	2.6	7.4	0.182	310
DNGW-200LD-02	37		32.5		35		2955	65	93	0.90	HS 4	2.6	2.8	7.5	0.20	325
DNGW-225MB-02	45		44		45		2965	79	93.5	0.89	HS 5	2.2	2.7	7.1	0.25	375
DNGW-250MB-02	55		55		55		2975	99	94.1	0.86	HS 5	2.3	3.2	7.4	0.48	500
DNGW-280SG-02	75		70		75		2980	130	94.7	0.89	HS 4	2.2	2.2	6.8	0.88	725
DNGW-280MG-02	90		81		85		2975	155	95	0.90	HS 4	2.0	2.2	6.5	1.03	775
DNSW-315SB-02	110		97		102		2975	190	95	0.89	DS 4	2.0	2.4	6.5	1.61	950
DNSW-315MB-02	132		118		125		2980	225	95.5	0.89	DS 4	2.0	2.4	6.5	1.91	1030
DNSW-315MD-02	160		150		160		2980	275	95.8	0.89	DS 4	2.3	2.6	6.7	2.3	1100
DNSW-315LB-02	200		172		183		2980	335	96	0.90	DS 4	2.5	2.7	6.8	2.8	1350

Higher outputs, other duty types, pole numbers and pole-changing motors on request.  
 Motors which have not yet been certified are subject to modifications.

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure”**  
**Frame sizes 071 to 315: EEx de IIC**

**400V – 50 Hz**  
**Temperature class T4**

**Types: DNGW/DNSW      Number of poles: 4      – 50 Hz**

Type	Rated output at permissible temperature rise and cooling air temperature												
	VDE 40°C	70K ABS 50°C BV 50°C DNV 45°C LROs 45°C RINA 50°C	75K GL 45°C RS 45°C	Rated speed	Rated current at	Efficiency 4/4	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	kW	kW	min <sup>-1</sup>	400V A	η %	cosφ		with direct-on starting as a multiple of the rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 1500 min<sup>-1</sup></b>													
DNGW-071BH-04	0.37	0.37	0.37	1360	1.1	65	0.77	HS 5	2.5	2.5	3.6	0.0009	13
DNGW-080BH-04	0.75	0.70	0.72	1380	1.9	73	0.79	HS 4	2.0	2.1	3.8	0.0020	22
DNGW-090LD-04	1.5	1.5	1.5	1410	3.4	79	0.83	HS 5	2.5	2.7	5.1	0.0036	32
DNGW-100LB-04	2.2	2.1	2.2	1400	4.8	81	0.84	HS 5	2.2	2.5	5.3	0.0051	37
DNGW-100LD-04	3.0	2.6	2.7	1410	6.6	82.6	0.82	HS 5	2.5	2.7	5.8	0.0066	40
DNGW-112MB-04	4.0	3.5	3.7	1415	8.3	84	0.84	HS 5	2.2	2.6	5.9	0.012	57
DNGW-132SL-04	5.5	5.2	5.5	1440	11	87	0.85	HS 5	2.3	2.7	6.4	0.022	85
DNGW-132ML-04	7.5	7.1	7.5	1445	15	88	0.85	HS 5	2.6	3.0	7.2	0.030	100
DNGW-160ML-04	11	10	10.5	1460	21	90	0.84	HS 5	2.5	2.4	6.1	0.068	150
DNGW-160LL-04	15	13	13.6	1455	29	90.7	0.85	HS 4	2.9	2.3	6.2	0.092	180
DNGW-180MB-04	18.5	17.5	18.5	1465	34.5	91.3	0.86	DS 5	2.9	2.6	6.8	0.13	190
DNGW-180LB-04	22	22	22	1465	41	91.9	0.86	DS 5	2.9	2.5	6.7	0.16	210
DNGW-200LB-04	30	28	30	1465	55	92.5	0.87	HS 4	2.4	2.2	6.4	0.25	310
DNGW-225SB-04	37	33	35	1470	68	93	0.87	HS 4	2.2	2.2	6.3	0.35	360
DNGW-225MB-04	45	39	42	1475	84	93.2	0.84	HS 5	2.6	2.5	6.7	0.40	400
DNGW-250MB-04	55	51	53	1480	97	94.5	0.88	HS 5	2.4	2.9	7.6	0.80	510
DNGW-280SG-04	75	75	75	1480	132	94.7	0.88	HS 4	2.2	2.5	6.5	1.44	750
DNGW-280MG-04	90	80	85	1480	157	95	0.88	HS 4	2.3	2.5	6.5	1.65	800
DNGW-315SB-04	110	110	110	1485	200	95.2	0.85	DS 4	2.1	2.3	6.5	2.4	980
DNGW-315MB-04	132	120	125	1485	240	95.5	0.85	DS 4	2.1	2.3	6.5	2.9	1050
DNGW-315MD-04	160	150	160	1485	285	95.6	0.86	DS 4	2.1	2.2	6.5	3.4	1120
DNGW-315LB-04	200	173	178	1485	355	95.7	0.85	DS 4	2.5	2.5	6.6	4.0	1350

Higher outputs, other duty types, pole numbers and pole-changing motors on request.  
 Motors which have not yet been certified are subject to modifications.



## Ship and marine motors, Output tables

### Three-phase motors with squirrel cage

Totally enclosed fan-cooled, enclosure IP 55

**460V – 60 Hz**

**Types: ANGA**

**Number of poles: 2**

**– 60 Hz**

**Duty type S1**

Type	Rated output at permissible temperature rise and cooling air temperature															
	VDE	40°C	70K		75K		Rated speed	Rated current at	Efficiency 4/4	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia	Net weight
			ABS	50°C	GL	45°C										
			BV	50°C	RS	45°C										
			DNV	45°C												
			LRoS	45°C												
			RINA	50°C												

<sup>1</sup> Type ANGA-315

We reserve us the right to deliver foot-mounted types (ANGA) in welded design.  
(Additional weight approx. 80 kg acc. to quotation and confirmation respectively).

\* Utilization to insulation class F.

Higher outputs, other duty types, pole numbers and pole-changing motors on request.  
Motors which have not yet been certified are subject to modifications.

**Three-phase motors with squirrel cage**  
Totally enclosed fan-cooled, enclosure IP 55

**460V – 60 Hz**

**Types: ANGA**

**Number of poles: 4**

**– 60 Hz**

**Duty type S1**

Type	Rated output at permissible temperature rise and cooling air temperature												
	VDE 40°C	70K ABS 50°C BV 50°C DNV 45°C LROs 45°C RINA 50°C	75K GL 45°C RS 45°C	Rated speed	Rated current at	Efficiency 4/4	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	kW	kW	min <sup>-1</sup>	460V A	η %	cosφ		with direct-on starting as a multiple of the rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 1800 min<sup>-1</sup></b>													
ANGA-090LB-04	1.8	1.9	1.95	1720	3.5	80.4	0.82	HS 4	2.2	2.3	5.3	0.0036	22
ANGA-100LB-04	2.6	2.5	2.6	1700	5.0	81.3	0.84	HS 5	2.2	2.5	5.4	0.0051	35
ANGA-100LD-04	3.4	3.2	3.4	1700	6.4	83	0.83	HS 5	2.6	2.7	6	0.0066	38
ANGA-112MB-04	4.8	4.5	4.8	1720	8.3	85	0.85	HS 5	2.4	2.8	6.3	0.012	41
ANGA-132SB-04	6.6	6.6	6.8	1740	11.5	88	0.85	HS 4	2.1	2.4	6.7	0.022	59
ANGA-132MB-04	8.6	8.2	8.5	1735	14.5	88.5	0.85	HS 5	2.2	2.5	7	0.030	69
ANGA-160MB-04	13.2	12.9	13.2	1760	22.5	91	0.82	HS 5	2.9	2.5	7.1	0.068	108
ANGA-160LB-04	18	16	17	1760	30.5	91.4	0.82	HS 5	3.0	2.6	7.3	0.092	130
ANGA-180MB-04	22	20.6	22	1765	36	91.5	0.85	DS 5	3.0	2.4	6.8	0.13	162
ANGA-180LB-04	26	23.3	25	1765	39	91.6	0.87	DS 5	2.9	2.5	6.9	0.16	176
ANGA-200LG-04	36	32	34	1765	56	93.1	0.87	HS 5	2.6	2.6	6.8	0.25	254
ANGA-225SE-04	44	40	43	1770	70	93.2	0.84	HS 4	2.3	2.6	6.0	0.34	305
ANGA-225ME-04	54	49	51	1770	89	93.4	0.82	HS 5	2.8	2.6	6.1	0.41	335
ANGA-250ME-04	66	64	66	1780	101	94.5	0.87	HS 5	2.4	2.7	7.9	0.80	425
ANGA-280SG-04 *	90	78	84	1775	136	95	0.87	HS 4	2.1	2.3	6.2	1.44	585
ANGA-280MG-04 *	108	90	94	1780	166	94.8	0.86	HS 5	2.4	2.6	7.0	1.65	660
ANGA-315SB-04	127	115	120	1785	196	94.8	0.86	DS 4	2.2	2.3	7.2	2.4	795
ANGA-315MB-04	150	130	135	1785	230	95.5	0.85	DS 4	2.2	2.3	7.0	2.9	890
ANGA-315MD-04	180	160	165	1785	280	95.5	0.85	DS 4	2.2	2.2	7.0	3.4	960
ANGA-315LB-04	220	200	210	1785	345	96	0.84	DS 5	2.9	2.6	7.4	4.0	1165
ANGA-355MB-04	240	210	220	1787	370	96.1	0.85	DS 4	2.0	2.3	7.0	5.5	1520
ANGA-355MB-04	275	245	260	1790	405	96.7	0.87	HS 2	1.7	2.5	7.5	5.5	1520
ANGA-355LB-04	300	270	280	1788	450	96.6	0.86	DS 4	2.0	2.3	7.1	6.8	1730
ANGA-355LB-04 *	350	280	300	1790	535	96.7	0.85	HS 2	1.2	2.6	7.1	6.8	1730

\* Utilization to insulation class F.

Higher outputs, other duty types, pole numbers and pole-changing motors on request.  
Motors which have not yet been certified are subject to modifications.

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure”**  
**Frame sizes 071 to 315: EEx de IIC**

**460V – 60 Hz**

**Temperature class T4**

**Types: DNGW/DNSW      Number of poles: 2      – 60 Hz**

Type	Rated output at permissible temperature rise and cooling air temperature												
	70K	75K	Rated speed	Rated current at	Efficiency 4/4	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia	Net weight	
VDE 40°C	ABS 50°C BV 50°C DNV 45°C LRS 45°C RINA 50°C	GL 45°C RS 45°C											
	with direct-on starting as a multiple of the										J		
kW	kW	kW	min <sup>-1</sup>	460V A	η %	cosφ		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg	
Speed 3600 min <sup>-1</sup>													
DNGW-071BH-02	0.66	0.66	0.66	3310	1.4	71	0.88	HS 5	2.7	2.7	4.6	0.0004	13
DNGW-080BH-02	1.3	1.3	1.3	3380	2.55	79	0.86	HS 5	3.1	3.0	6.0	0.0008	22
DNGW-090LD-02	2.6	2.5	2.6	3440	4.7	82.5	0.87	HS 5	3.0	3.2	7.0	0.0020	22
DNGW-100LB-02	3.6	3.5	3.7	3465	6.2	84.5	0.88	HS 5	2.8	3.1	7.5	0.0031	35
DNGW-112MB-02	4.8	4.8	5	3480	7.7	86.5	0.92	HS 5	3.0	3.4	7.7	0.0060	55
DNGW-132SL-02	6.6	7.0	7.2	3490	10.8	86.5	0.92	HS 5	2.5	2.9	6.5	0.0110	85
DNGW-132SN-02	8.6	8.3	8.6	3490	14	88	0.89	HS 5	2.8	3.2	7.1	0.0140	90
DNGW-160ML-02	13.2	12.9	13.2	3510	21.5	89.7	0.87	HS 5	2.5	2.7	6.5	0.0364	150
DNGW-160MN-02	18	17	17.5	3515	29	90.2	0.87	HS 5	2.9	3.1	6.4	0.0445	155
DNGW-160LL-02	22	20	21.5	3520	34	91.3	0.89	HS 5	2.8	2.9	6.9	0.057	175
DNGW-180MB-02	27	25	26	3545	44	91.3	0.86	HS 5	2.0	2.6	7.0	0.094	190
DNGW-200LB-02	36	36	37	3550	55	93	0.88	HS 5	2.5	2.5	7.1	0.182	310
DNGW-200LD-02	44	40	41	3560	66	93.8	0.89	HS 4	2.5	2.6	7.3	0.200	325
DNGW-225MB-02	54	54	55	3565	83	94	0.88	HS 4	2.2	2.6	7.2	0.247	375
DNGW-250MB-02	64	60	62	3570	100	94.1	0.86	HS 5	2.3	2.9	7.3	0.48	500
DNGW-280SG-02	86	84	85	3575	132	94.7	0.87	HS 4	2.2	2.2	6.8	0.88	725
DNGW-280MG-02	110	105	110	3575	167	95	0.88	HS 4	2.0	2.4	7.0	1.03	775
DNSW-315SB-02	120	115	120	3580	183	95	0.88	DS 4	2.0	2.4	6.6	1.61	950
DNSW-315MB-02 *	150	140	142	3575	220	95.6	0.89	DS 4	2.1	2.5	6.9	1.91	1030
DNSW-315MD-02	185	170	175	3580	273	95.9	0.89	DS 5	2.5	2.6	7.3	2.3	1100
DNSW-315LB-02 *	220	200	205	3580	320	96.3	0.90	DS 4	2.4	2.6	7.1	2.8	1350

\* Utilization to insulation class F.

Higher outputs, other duty types, pole numbers and pole-changing motors on request.  
 Motors which have not yet been certified are subject to modifications.

**Three-phase motors with squirrel cage**  
 Totally enclosed fan-cooled, enclosure IP 55  
**Protection type “Flameproof Enclosure”**  
**Frame sizes 071 to 315: EEx de IIC**

**460V – 60 Hz**  
**Temperature class T4**

**Types: DNGW/DNSW      Number of poles: 4      – 60 Hz**

Type	Rated output at permissible temperature rise and cooling air temperature												
	VDE 40°C	70K ABS 50°C BV 50°C DNV 45°C LRS 45°C RINA 50°C	75K GL 45°C RS 45°C	Rated speed	Rated current at	Efficiency 4/4	Power factor	Rotor class	Starting torque	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	kW	kW	min <sup>-1</sup>	460V A	η %	cosφ		with direct-on starting as a multiple of the rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg
<b>Speed 1800 min<sup>-1</sup></b>													
DNGW-071BH-04	0.44	0.45	0.45	1650	1.06	67.8	0.8	HS 4	2.4	2.4	4	0.0009	13
DNGW-080BH-04	0.9	0.9	0.9	1670	2.0	73.5	0.80	HS 4	2.0	2.1	4	0.0020	22
DNGW-090LD-04	1.8	1.9	1.95	1720	3.5	80.4	0.82	HS 4	2.2	2.3	5.3	0.0036	32
DNGW-100LB-04	2.6	2.5	2.6	1700	5.0	81.3	0.84	HS 5	2.2	2.5	5.4	0.0051	37
DNGW-100LD-04	3.4	3.2	3.4	1705	6.4	83	0.83	HS 5	2.6	2.7	6	0.0066	40
DNGW-112MB-04	4.8	4.5	4.8	1720	8.3	85	0.85	HS 5	2.4	2.8	6.3	0.012	57
DNGW-132SL-04	6.6	6.6	6.8	1740	11.5	88	0.85	HS 4	2.1	2.4	6.7	0.022	85
DNGW-132ML-04	8.6	8.2	8.5	1735	14.5	88.5	0.85	HS 5	2.4	2.6	7	0.030	100
DNGW-160ML-04	13.2	12.9	13.2	1760	22.5	91	0.82	HS 5	2.9	2.5	7.1	0.068	150
DNGW-160LL-04	18	16	17	1760	30.5	91.4	0.82	HS 5	3.0	2.6	7.3	0.092	180
DNGW-180MB-04	22	20.6	22	1765	36	91.5	0.85	DS 5	3.0	2.4	6.8	0.13	190
DNGW-180LB-04	26	23.3	25	1765	39	91.6	0.87	DS 5	2.9	2.5	6.9	0.16	210
DNGW-200LB-04	36	32	34	1765	56	93.1	0.87	HS 5	2.6	2.6	6.8	0.25	310
DNGW-225SB-04	44	40	43	1770	70	93.2	0.84	HS 4	2.3	2.6	6.0	0.34	360
DNGW-225MB-04	54	49	51	1770	89	93.4	0.82	HS 5	2.8	2.6	6.1	0.41	400
DNGW-250MB-04	66	64	66	1780	101	94.5	0.87	HS 5	2.4	2.7	7.9	0.80	510
DNGW-280SG-04 *	90	78	84	1775	136	95	0.87	HS 4	2.1	2.3	6.2	1.44	750
DNGW-280MG-04 *	108	90	94	1780	166	94.8	0.86	HS 5	2.4	2.6	7.0	1.65	800
DNGW-315SB-04	127	115	120	1785	196	94.8	0.86	DS 4	2.2	2.3	7.2	2.4	980
DNGW-315MB-04	150	130	135	1785	230	95.5	0.85	DS 4	2.2	2.3	7.0	2.9	1050
DNGW-315MD-04	180	160	165	1785	280	95.3	0.85	DS 4	2.5	2.4	7.1	3.4	1120
DNGW-315LB-04	220	200	210	1785	345	96	0.84	DS 5	2.9	2.6	7.4	4.0	1350

\* Utilization to insulation class F.

Higher outputs, other duty types, pole numbers and pole-changing motors on request.  
 Motors which have not yet been certified are subject to modifications.

**Series A... / E...:**

**Compiled dimension drawings see  
Series ANGA, AMGA, AVGA, AMGK, ENG., EMG,  
(see page 86)**

**Series DNGW / DNSW:**

**Compiled dimension drawings see  
Series DN..  
(see page 184)**

# Medium-voltage motors

**General**  
**Mains connection**  
**Special designs**

## General

A specific winding technology and the respective special insulation system allow making of the voltage levels "up to 3.3 kV" and "up to 4.16 kV" with round-wire fed-in windings. Due to this the die set of the standard motor can be used to build machines, which up to this date were only executable by means of formed coil winding and the related machine size.

Main focus of application of such medium-voltage motors is for the frame sizes 280 and 315. For smaller frame sizes it is problematic to keep the air gaps and the creepage distances, for larger frame sizes the conventional formed coil winding exists anyway and is well applicable.

The thermal utilization corresponds with insulation class "B". Only for few exceptions "partially F" is used. These motors are identified in the output tables with an \*.

Standard motors are made with die-cast rotor. The rotor class corresponds approximately to "HS4".

The following type series of these medium-voltage motors in enclosure IP 55 (higher enclosure on request) are available:

AJSA: without Ex-protection  
AJSK: Protection type EEx nA II  
DJSW: Protection type EEx de IIC or EEx d IIC

For tolerances, rotor classes, structural design, noise data, radial

forces, bearings, etc. the information of this technical list on low volt-

age motors of the types ANGA, AMGK, DN.W is applicable.

## Mains connection

The motors are connected via a terminal box designed for a rated voltage of 6.6 kV.

### Terminal box location:

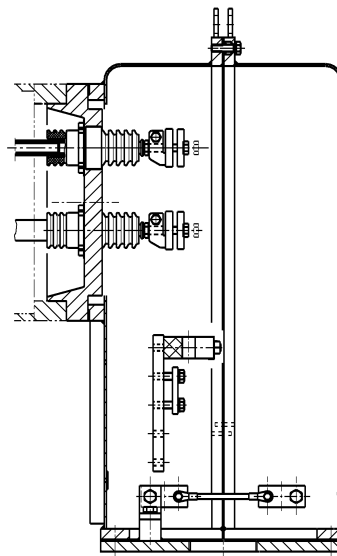
In standard design "right from the driving end".

Optional:

"on top" or "left from the driving end"

#### Example:

Terminal box for	DJSW
Protection type	EEx e II
Enclosure	IP 56
Cross section	16–150 mm <sup>2</sup>



## Special designs (surcharge)

- Copper rotor
- Star-point terminal box
- Space heater
- Winding temperature monitoring with PTC thermistor or PT100
- Bearing temperature monitoring with PTC thermistor or PT100
- Other special designs on request

## Medium-voltage motors, Output tables

**Types: AJSA**                      **Number of poles: 2**                      **UN = 3.3 kV / 4.16 kV**

**Types: AJSA**                      **Number of poles: 4**                      **UN = 3.3 kV / 4.16 kV**

Type	Rated output	Rated speed	Rated current at U <sub>N</sub>	Efficiency $\eta$	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	A	%	cos $\varphi$		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg

### Speed 3000 min<sup>-1</sup>

#### UN = 3.3 kV

AJSA-280LB-02	55	2980	11.5	93.5	0.90	HS4	1.8	3.0	7.5	1.03	
AJSA-280LC-02	75	2980	15.5	94.0	0.90	HS 4	1.9	3.0	7.5	1.03	
AJSA-315LB-02	90	2975	19.0	94.5	0.90	HS 4	1.9	2.5	7.0	2.33	
AJSA-315LC-02	110	2980	23.0	95.0	0.90	HS 4	2.0	2.7	7.5	2.33	
AJSA-315LD-02	132	2980	27.0	95.3	0.90	HS 4	2.1	2.9	7.3	2.8	
AJSA-315LE-02 *	150	2983	30.5	95.5	0.89	HS 4	2.4	3.2	7.7	2.8	

### Speed 3000 min<sup>-1</sup>

#### UN = 4.16 kV

AJSA-280LB-02	55	2983	9.0	93.0	0.90	HS4	1.9	3.0	7.7	1.03	
AJSA-315LB-02	75	2975	12.5	93.5	0.89	HS 4	1.8	2.5	7.3	2.33	
AJSA-315LC-02	90	2980	15.0	94.2	0.89	HS 4	2.0	3.0	7.6	2.33	
AJSA-315LD-02	110	2980	18.0	94.8	0.90	HS 4	2.0	2.9	7.4	2.8	
AJSA-315LE-02 *	132	2980	21.5	95.0	0.90	HS 4	2.1	3.0	7.5	2.8	

### Speed 1500 min<sup>-1</sup>

#### UN = 3.3 kV

AJSA-280LB-04	55	1485	12.0	93.7	0.87	HS4	2.0	2.4	7.0	1.66	
AJSA-280LC-04	75	1485	16.5	94.0	0.85	HS 4	2.5	2.8	7.6	1.66	
AJSA-315LB-04	90	1490	20.0	94.5	0.83	HS 4	2.7	2.8	7.5	3.3	
AJSA-315LC-04	110	1490	24.5	95.0	0.83	HS 4	2.7	2.8	7.5	3.3	
AJSA-315LD-04	132	1490	29.0	95.3	0.84	HS 4	2.7	2.7	7.5	3.9	
AJSA-315LE-04 *	150	1490	33.5	95.5	0.83	HS 4	2.9	2.9	7.5	3.9	

### Speed 1500 min<sup>-1</sup>

#### UN = 4.16 kV

AJSA-280LB-04	55	1485	9.5	93.5	0.86	HS4	2.1	2.5	7.4	1.66	
AJSA-315LB-04 *	75	1490	13.5	93.6	0.83	HS 4	2.6	2.7	7.5	3.3	
AJSA-315LC-04	90	1490	16.0	94.1	0.83	HS 4	2.7	2.8	7.6	3.3	
AJSA-315LD-04	110	1490	19.5	94.5	0.84	HS 4	2.7	2.7	7.4	3.9	
AJSA-315LE-04	132	1490	23.0	95.0	0.84	HS 4	2.7	2.7	7.4	3.9	

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

Subject to modifications

Types: AJSK

Number of poles: 2

UN = 3.3 kV / 4.16 kV

Types: AJSK

Number of poles: 4

UN = 3.3 kV / 4.16 kV

Type	Rated output	Rated speed	Rated current at $U_N$	Efficiency $\eta$	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	A	%	cos $\varphi$		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg

**Speed 3000 min<sup>-1</sup>****UN = 3.3 kV**

AJSK-280LB-02	55	2980	11.5	93.5	0.90	HS4	1.8	3.0	7.5	1.03	
AJSK-280LC-02	75	2980	15.5	94.0	0.90	HS 4	1.9	3.0	7.5	1.03	
AJSK-315LB-02	90	2975	19.0	94.5	0.90	HS 4	1.9	2.5	7.0	2.33	
AJSK-315LC-02	110	2980	23.0	95.0	0.90	HS 4	2.0	2.7	7.5	2.33	
AJSK-315LD-02	132	2980	27.0	95.3	0.90	HS 4	2.1	2.9	7.3	2.8	
AJSK-315LE-02 *	150	2983	30.5	95.5	0.89	HS 4	2.4	3.2	7.7	2.8	

**Speed 3000 min<sup>-1</sup>****UN = 4.16 kV**

AJSK-280LB-02	55	2983	9.0	93.0	0.90	HS4	1.9	3.0	7.7	1.03	
AJSK-315LB-02	75	2975	12.5	93.5	0.89	HS 4	1.8	2.5	7.3	2.33	
AJSK-315LC-02	90	2980	15.0	94.2	0.89	HS 4	2.0	3.0	7.6	2.33	
AJSK-315LD-02	110	2980	18.0	94.8	0.90	HS 4	2.0	2.9	7.4	2.8	
AJSK-315LE-02 *	132	2980	21.5	95.0	0.90	HS 4	2.1	3.0	7.5	2.8	

**Speed 1500 min<sup>-1</sup>****UN = 3.3 kV**

AJSK-280LB-04	55	1485	12.0	93.7	0.87	HS4	2.0	2.4	7.0	1.66	
AJSK-280LC-04	75	1485	16.5	94.0	0.85	HS 4	2.5	2.8	7.6	1.66	
AJSK-315LB-04	90	1490	20.0	94.5	0.83	HS 4	2.7	2.8	7.5	3.3	
AJSK-315LC-04	110	1490	24.5	95.0	0.83	HS 4	2.7	2.8	7.5	3.3	
AJSK-315LD-04	132	1490	29.0	95.3	0.84	HS 4	2.7	2.7	7.5	3.9	
AJSK-315LE-04 *	150	1490	33.5	95.5	0.83	HS 4	2.9	2.9	7.5	3.9	

**Speed 1500 min<sup>-1</sup>****UN = 4.16 kV**

AJSK-280LB-04	55	1485	9.5	93.5	0.86	HS4	2.1	2.5	7.4	1.66	
AJSK-315LB-04 *	75	1490	13.5	93.6	0.83	HS 4	2.6	2.7	7.5	3.3	
AJSK-315LC-04	90	1490	16.0	94.1	0.83	HS 4	2.7	2.8	7.6	3.3	
AJSK-315LD-04	110	1490	19.5	94.5	0.84	HS 4	2.7	2.7	7.4	3.9	
AJSK-315LE-04	132	1490	23.0	95.0	0.84	HS 4	2.7	2.7	7.4	3.9	

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

Subject to modifications



Types: DJSW

Number of poles: 2

UN = 3.3 kV / 4.16 kV

Types: DJSW

Number of poles: 4

UN = 3.3 kV / 4.16 kV

Type	Rated output	Rated speed	Rated current at $U_N$	Efficiency $\eta$	Power factor	Rotor class	Starting torque with direct-on starting as a multiple of the	Breakd. torque	Starting current	Moment of inertia J	Net weight
	kW	min <sup>-1</sup>	A	%	cos $\varphi$		rated torque	rated torque	rated current	kg m <sup>2</sup>	approx. kg

#### Speed 3000 min<sup>-1</sup>

#### UN = 3.3 kV

DJSW-280LB-02	55	2980	11.5	93.5	0.90	HS4	1.8	3.0	7.5	1.03	
DJSW-280LC-02	75	2980	15.5	94.0	0.90	HS 4	1.9	3.0	7.5	1.03	
DJSW-315LB-02	90	2975	19.0	94.5	0.90	HS 4	1.9	2.5	7.0	2.33	
DJSW-315LC-02	110	2980	23.0	95.0	0.90	HS 4	2.0	2.7	7.5	2.33	
DJSW-315LD-02	132	2980	27.0	95.3	0.90	HS 4	2.1	2.9	7.3	2.8	
DJSW-315LE-02 *	150	2983	30.5	95.5	0.89	HS 4	2.4	3.2	7.7	2.8	

#### Speed 3000 min<sup>-1</sup>

#### UN = 4.16 kV

DJSW-280LB-02	55	2983	9.0	93.0	0.90	HS4	1.9	3.0	7.7	1.03	
DJSW-315LB-02	75	2975	12.5	93.5	0.89	HS 4	1.8	2.5	7.3	2.33	
DJSW-315LC-02	90	2980	15.0	94.2	0.89	HS 4	2.0	3.0	7.6	2.33	
DJSW-315LD-02	110	2980	18.0	94.8	0.90	HS 4	2.0	2.9	7.4	2.8	
DJSW-315LE-02 *	132	2980	21.5	95.0	0.90	HS 4	2.1	3.0	7.5	2.8	

#### Speed 1500 min<sup>-1</sup>

#### UN = 3.3 kV

DJSW-280LB-04	55	1485	12.0	93.7	0.87	HS4	2.0	2.4	7.0	1.66	
DJSW-280LC-04	75	1485	16.5	94.0	0.85	HS 4	2.5	2.8	7.6	1.66	
DJSW-315LB-04	90	1490	20.0	94.5	0.83	HS 4	2.7	2.8	7.5	3.3	
DJSW-315LC-04	110	1490	24.5	95.0	0.83	HS 4	2.7	2.8	7.5	3.3	
DJSW-315LD-04	132	1490	29.0	95.3	0.84	HS 4	2.7	2.7	7.5	3.9	
DJSW-315LE-04 *	150	1490	33.5	95.5	0.83	HS 4	2.9	2.9	7.5	3.9	

#### Speed 1500 min<sup>-1</sup>

#### UN = 4.16 kV

DJSW-280LB-04	55	1485	9.5	93.5	0.86	HS4	2.1	2.5	7.4	1.66	
DJSW-315LB-04 *	75	1490	13.5	93.6	0.83	HS 4	2.6	2.7	7.5	3.3	
DJSW-315LC-04	90	1490	16.0	94.1	0.83	HS 4	2.7	2.8	7.6	3.3	
DJSW-315LD-04	110	1490	19.5	94.5	0.84	HS 4	2.7	2.7	7.4	3.9	
DJSW-315LE-04	132	1490	23.0	95.0	0.84	HS 4	2.7	2.7	7.4	3.9	

Higher outputs, other voltages and frequencies on request.

\* Utilization to insulation class F.

Subject to modifications

**Dimension drawings with terminal box on the right from driving end**

Type	Frame size	Number of poles	Noise grade	Dimension drawing Mounting IM B3	Dimension drawing Mounting IM B5 Mounting IM V1
AJSA, AJSK	280L.	02	1	<b>MLA28-1002</b>	<b>MLA28-1008</b>
	280L.	04	1	<b>MLA28-1003</b>	<b>MLA28-1009</b>
	315L.	02	3	<b>MLA31-1002</b>	<b>MLA31-1012</b>
	315L.	04	1	<b>MLA31-1003</b>	<b>MLA31-1011</b>
DJSW	280L.	02	1	<b>MLD28-1001</b>	<b>MLD28-1004</b>
	280L.	04	1	<b>MLD28-1002</b>	<b>MLD28-1005</b>
	315L.	02	3	<b>MLD31-1004</b>	<b>MLD31-1005</b>
	315L.	04	1	<b>MLD31-1003</b>	<b>MLD31-1006</b>

Other mounting types on request.

The indicated dimension drawings are included in the Appendix of this technical list from Page 247 in ascending order.

# Documentation A..../ E.... /D....

## Certificates

### Motors without explosion protection Type series A..A

EC Declaration of manufacturer
--------------------------------

### Motors II 3 G EEx nA II Type series A..K

EC Declaration of conformity
EC Conformity statement

### Motors II 2 G EEx e II Type series E...

EC Declaration of conformity
------------------------------

EC-Type-examination test certificate			
Frame size	Number of poles 02	Number of poles 04	Number of poles 06
090LX	98 ATEX 3507-29	*	*
090LB	98 ATEX 3507-04	98 ATEX 3507-08	98 ATEX 3507-16
100LB	98 ATEX 3508-02	98 ATEX 3508-10	98 ATEX 3508-12
100LD	—	98 ATEX 3508-06	—
112MB	—	98 ATEX 3509-04	98 ATEX 3509-06
112MD	98 ATEX 3509-08	—	—
132SB	—	98 ATEX 3510-06	98 ATEX 3510-20
132SD	98 ATEX 3510-12	—	—
132SX	98 ATEX 3510-14	—	—
132MB	—	98 ATEX 3510-08	98 ATEX 3510-22
132MD	—	—	*
160MB	98 ATEX 3511-02	98 ATEX 3511-08	98 ATEX 3511-17
160MD	98 ATEX 3511-12	—	—
160LB	98 ATEX 3511-67	98 ATEX 3511-10	98 ATEX 3511-19
180MB	98 ATEX 3512-02	98 ATEX 3512-04	—
180LB	—	98 ATEX 3512-06	98 ATEX 3512-08
200LG	98 ATEX 3513-02	98 ATEX 3513-06	*
200LJ	98 ATEX 3513-04	—	*
225SB	—	98 ATEX 3514-04	—
225MB	98 ATEX 3514-02	98 ATEX 3514-06	*
250MB	98 ATEX 3515-02	98 ATEX 3516-04	*
280SG	98 ATEX 3516-02	98 ATEX 3516-06	*
280MG	98 ATEX 1516-04	98 ATEX 3516-08	*
315SA	—	—	—
315SB	98 ATEX 3517-02	98 ATEX 3517-12	98 ATEX 3517-29
315MB	98 ATEX 3517-06	98 ATEX 3517-14	*
315MC	—	—	*
315MD	98 ATEX 3517-08	98 ATEX 3517-16	*
315LB	98 ATEX 3517-26	98 ATEX 3517-18	*
355MB	*	*	*
355LB	98 ATEX 3518-04	98 ATEX 3518-08	*

\* Upon acceptance

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# Documentation A..../ E.... /D....

## Certificates

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### Motors II 2 G EEx d IIC

### Type series DN.W

EC Declaration of conformity
------------------------------

Frame size	EC-Type-examination test certificate
071	PTB 01 ATEX 1086
080	PTB 01 ATEX 1086
090	PTB 03 ATEX 1109
100	PTB 01 ATEX 1086
112	PTB 03 ATEX 1110
132	PTB 02 ATEX 1003
160	PTB 02 ATEX 1081
180	PTB 01 ATEX 1027
200	PTB 01 ATEX 1027
225	PTB 01 ATEX 1027
250	PTB 01 ATEX 1027
280	PTB 01 ATEX 1027
315	PTB 01 ATEX 1027

### Motors II 2 D

### Type series A. / E. / DN

EC Declaration of conformity
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EC-Type-examination test certificate
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### Motors II 3 D

### Type series A. / E. / DN

EC Declaration of conformity
------------------------------

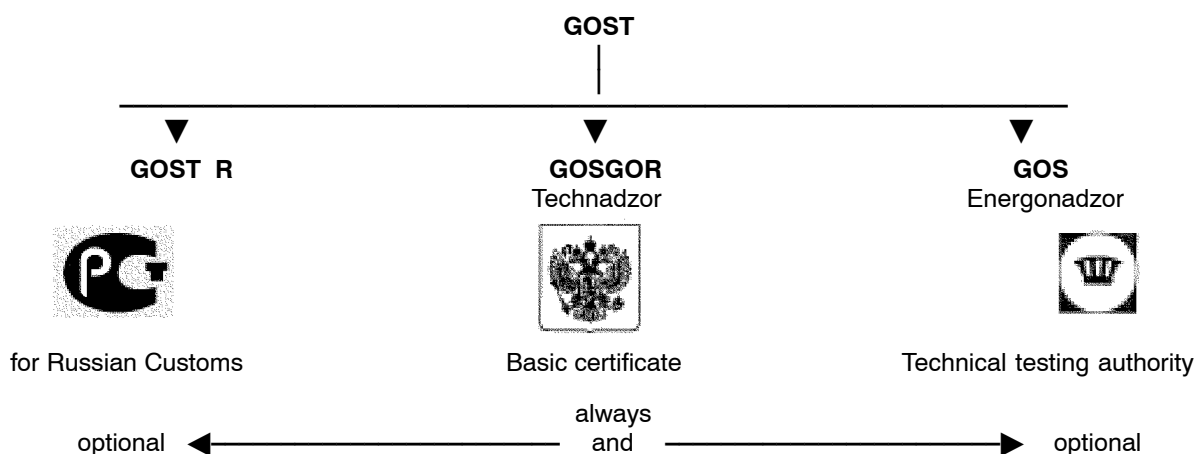
# Documentation A..../ E.... /D....

## Certificates

### GOST Certificates

Motors of the type series DN.W Frame sizes 071–315 are certified for the following ambient temperatures:

–20°C to +60°C  
–40°C to +60°C  
–55°C to +60°C



Ambient temperature	GOST R	GOSGOR Technadzor	GOS Energonadzor
–20°C to +60°C	Frame size 071–112: POCC DE.CH01.B 67638  Frame size 112–315: POCC DE.CH01.B 67639	Frame size 071–080, 100, 132–500: PPC 04-8510	606
–40°C to +60°C		Frame size 071–080, 100, 132–400: PPC 04-8511	607
–55°C to +60°C		Frame size 071–080, 100, 132–315: PPC 04-8512	608

### BKI Certificates

Frame size	EC-Type-examination certificate
071	BKI 03 ATEX 070
080	BKI 03 ATEX 071
090	BKI 03 ATEX 260
100	BKI 03 ATEX 072
112	BKI 03 ATEX 259
132	BKI 03 ATEX 073
160	BKI 03 ATEX 074
180	BKI 03 ATEX 075
200	BKI 03 ATEX 076
225	BKI 03 ATEX 077
250	BKI 03 ATEX 078
280	BKI 03 ATEX 079
315	BKI 03 ATEX 080

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# Documentation A.../ E.... /D....

Operating instructions  
Connection diagrams  
Technical information

---

## Operating instructions

**Motors without explosion protection    Type series A..A**

N-R 435 en 09.03
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**Motors II 3 G EEx nA II                      Type series A..K**  
**Motors II 2 G EEx e II                      Type series E...**

N-R 443 en 09.03
------------------

**Motors II 2 G EEx d IIC                      Type series DN.W**

N-R 445 en 09.03
------------------

## Connection diagrams

Three-phase motor, Y or $\Delta$ , 6 terminals	S1001
Three-phase motor, Y or $\Delta$ , 6 terminals, 3 PTC thermistors	S1001-1001
3 PTC thermistors on 2 terminals	S9001-1001
Space heater	S9001-0501

## TI, Technical Information on topical themes

Title	TI-No.
Axially mounted forced ventilation for Type ANLA 132–315	TI-No. 01/02 – Rev. a
Cable glands and dummy plugs	TI-No. 02/02 – Rev. c
Industrial motors for the application at an ambient temperature below $-20^{\circ}\text{C}$	TI-No. 04/02 – Rev. b

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# Miscellaneous / Accessories

## Couplings

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### Couplings

A flexible coupling is usually recommendable to connect a motor with the driven machine. Beside the torque transmission these couplings also allow to compensate a possible shaft displacement by means of flexible elements and consequently a dynamically fa-

vourable matching of the whole drive system. These couplings distinguish in particular by their compactness and flexibility. Damping is similar for all couplings. They can be used for ambient temperatures from  $-30^{\circ}\text{C}$  up to  $+80^{\circ}\text{C}$ . For a dynamic matching of the drive com-

ponents, flexible elements of a different hardness are available for all coupling types, if required. Any configuration of the coupling parts on the shafts to be connected is possible.

### Selection and determination of sizes

A selection of Flender couplings is shown on the following pages.

Couplings are mostly designed in accordance with the physical regu-

larities for output and speed. Torque shock loads, number of startings and ambient temperatures are also to be considered.

Please consult:

A. Friedrich FLENDER GmbH  
Alfred-Flender-Straße 77  
64393 BOCHOLT  
GERMANY  
Phone: (02871) 92-0  
Fax: (02871) 922596  
<http://www.flender.com>

# **FLENDER**

## **Scheibenkupplungen**

Drehsteife Kupplungen

### **Flange couplings**

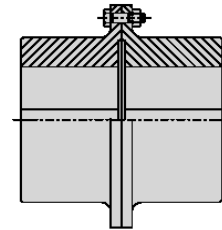
Torsionally rigid couplings

Verbinden zwei Wellenenden drehsteif und genau zentrisch miteinander • sind geeignet für schwerbeanspruchte Wellen • unterliegen keinem Verschleiß und sind wartungsfrei • sind für beide Drehrichtungen zu verwenden

Connect two shafts ends torsionally rigid and exactly centered to each other • are designed for heavily stressed shafts • are not subject to wear and require no maintenance • are suitable for both directions of rotation

Nenn Drehmoment / Nominal torque: 1 300 ... 180 000 Nm

*Katalog / Brochure K 410*



## **N-EUPEX**

Elastische Nockenkupplungen

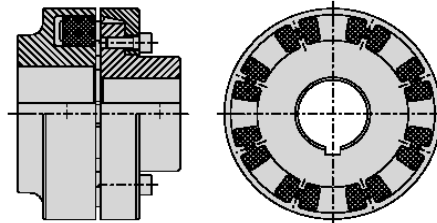
Flexible pin couplings

Universell einsetzbare Kupplung zum Ausgleich von Wellenverlagerungen • größtmögliche Betriebssicherheit da durchschlagsicher • geeignet für Steckmontage und vereinfachte Montage bei dreiteiliger Ausführung • geeignet für den Einsatz in Ex-Schutz Bereichen. Zertifiziert gemäß 94/9/EG (ATEX 100a)

Universally applicable coupling for compensating shaft displacements • maximum operational reliability owing to fail-safe device • suitable for plug-in assembly and simplified assembly of the design consisting of three parts • suitable for application in explosion-proof locations. Certified acc. to 94/9/EC (ATEX 100a)

Nenn Drehmoment / Nominal torque: 19 ... 62 000 Nm

*Katalog / Brochure K 420*



## **N-EUPEX-DS**

Elastische Nockenkupplungen

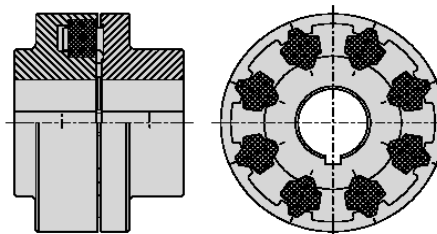
Flexible pin couplings

Trennen von An- und Abtrieb bei Ausfall der elastischen Elemente (ohne Durchschlagsicherung) • universell einsetzbar, da mit allen Teilen des N-EUPEX-Programms kombinierbar • geeignet für den Einsatz in Ex-Schutz Bereichen. Zertifiziert gemäß 94/9/EG (ATEX 100a)

Disconnecting driving and driven machines upon failure of flexible elements (without fail-safe device) • universally applicable since combination with all parts of the N-EUPEX product range is possible • suitable for application in explosion-proof locations. Certified acc. to 94/9/EC (ATEX 100a)

Nenn Drehmoment / Nominal torque: 19 ... 21 200 Nm

*Katalog / Brochure K 420*



## **BIPEX**

Elastische Klauenkupplungen

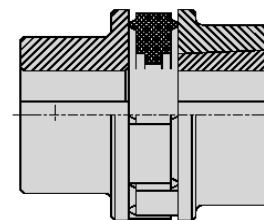
Flexible claw couplings

Durchschlagsichere Universalkupplung • sehr kompakte Konstruktion, hohe Leistungsdichte • bestens geeignet für Steckmontage und Laterneneinbau • auch mit Taper-Buchse für einfache Montage und Bohrungsanpassung

Fail-safe universal coupling • very compact design, high power capacity • very well suitable for plug-in assembly and assembly into bell housing • also with Taper bush for easy assembly and bore adaptation

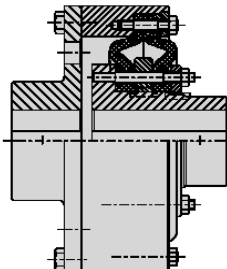
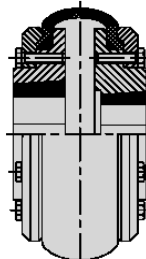
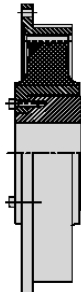
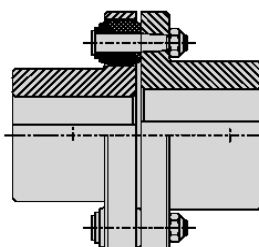
Nenn Drehmoment / Nominal torque: 13.5 ... 3 700 Nm

*Katalog / Brochure K 422*





# **FLENDER**

<p><b>ELPEX</b> Hochelastische Reifenkupplungen Highly flexible ring couplings</p> <p>Verdrehspeelfreie Kupplung • einsetzbar auch bei großen Wellenversetzungen • dynamisch hoch beanspruchbar, gute Dämpfungseigenschaften Coupling without torsional backlash • can be used for large misalignments • suitable for high dynamic loads, good damping properties</p> <p>Nenndrehmoment / Nominal torque: 1600 ... 90 000 Nm</p> <p><i>Katalog / Brochure K 425</i></p>	
<p><b>ELPEX-B</b> Hochelastische Gummireifenkupplungen Highly flexible rubber tyre couplings</p> <p>Verdrehspeelfreie Kupplung • Ausgleich von sehr großem Wellenversatz • der Gummireifen kann sehr leicht ohne Verschieben der gekuppelten Maschinen gewechselt werden • einfache Montage auf den Anschlußwellen mit Taper-Buchse Coupling without torsional backlash • compensating very large shaft misalignments • the rubber tyre can be easily replaced without the need to move the coupled machines • easy mounting on the shafts to be connected by means of Taper bushes</p> <p>Nenndrehmoment / Nominal torque: 24 ... 14 500 Nm</p> <p><i>Katalog / Brochure K 4251</i></p>	
<p><b>ELPEX-S</b> Hochelastische Gummischeibenkupplungen Highly flexible rubber disk couplings</p> <p>Zur Koppelung von Maschinen mit stark ungleichförmigem Drehmomentverlauf • sehr einfache Steckmontage • Wechsel der Gummischeibenelemente ohne Verschieben der gekuppelten Maschinen möglich • Flansch mit Abmessungen nach SAE J620d For connecting machines having a very non-uniform torque characteristic • very easy plug-in assembly • replacement of rubber disk element is possible without the need to move the coupled machines • flange with dimensions acc. to SAE J620d</p> <p>Nenndrehmoment / Nominal torque: 330 ... 63 000 Nm</p> <p><i>Katalog / Brochure K 4252</i></p>	
<p><b>RUPEX</b> Elastische Bolzenkupplungen Flexible pin and bush couplings</p> <p>Durchschlagsichere Universalkupplung für mittlere bis höchste Drehmomente mit guter Verlagerungsmöglichkeit • kompakte Konstruktion, geringe Gewichte und Massenträgheitsmomente • geeignet für Steckmontage Fail-safe universal coupling for medium up to high torques, absorbing large shaft displacements • compact design, low weights and mass moments of inertia • suitable for plug-in assembly</p> <p>Nenndrehmoment / Nominal torque: 210 ... 1 400 000 Nm</p> <p><i>Katalog / Brochure K 429</i></p>	



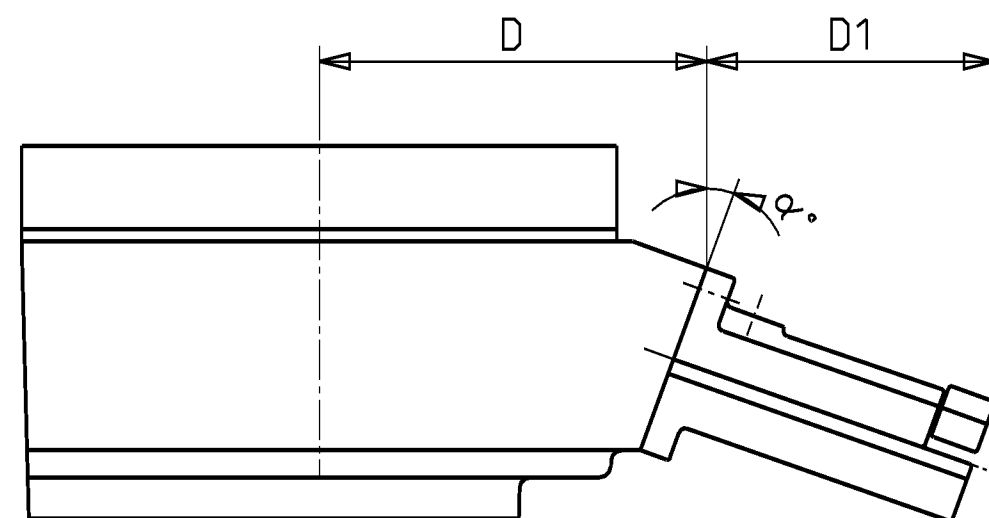
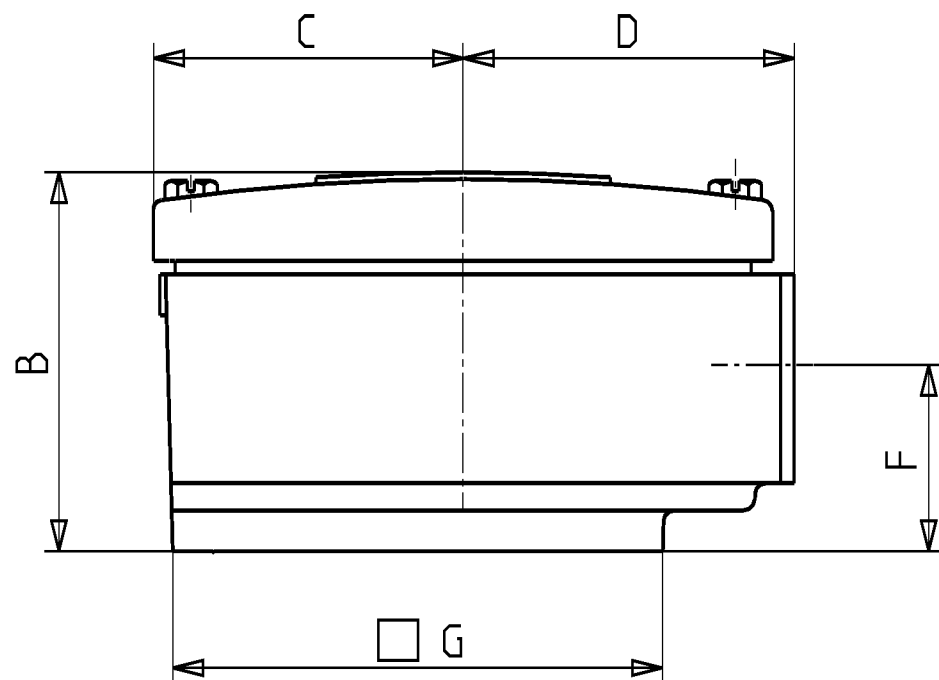
# Appendix

## Dimension drawings and Order–Checklist

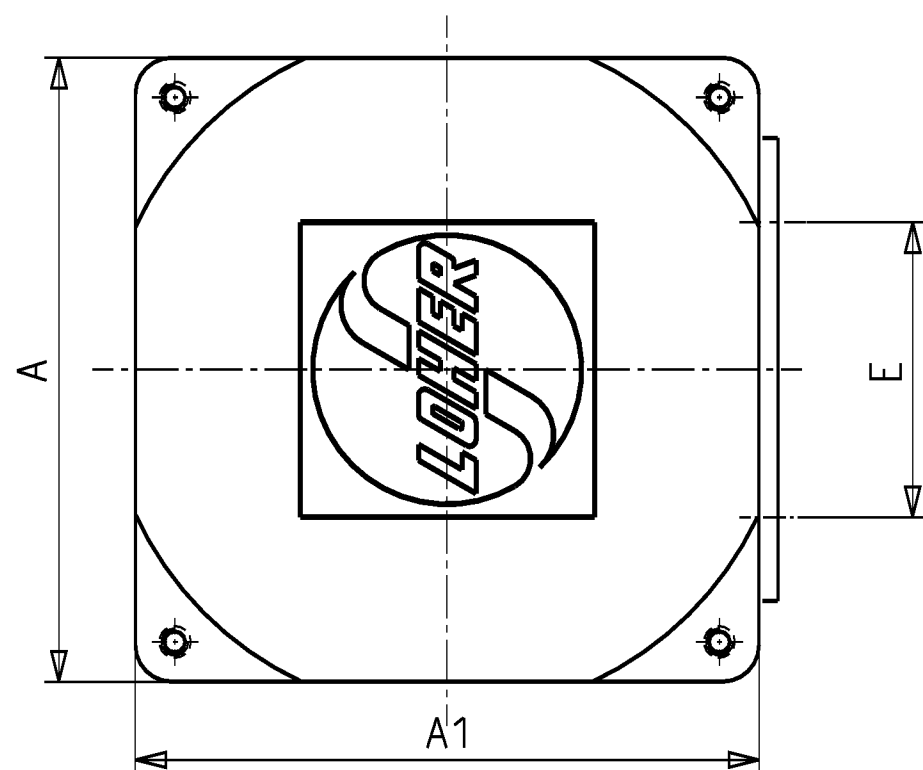
In the following all compiled dimension drawings of the list are added in ascending numbers:  
(please also see the notes in the dimension drawing tables)

Dimension drawing	for series
<b>M 11833B</b>	<b>Terminal box, D...</b>
<b>M 11834A</b>	
<b>M 143666</b>	<b>Terminal box, A...</b>
<b>MEB00–0006</b>	<b>BNCA</b>
<b>MEB00–0007</b>	
<b>MLA00–0001</b>	<b>A... / E...</b>
<b>MLA00–0002</b>	<b>ABGA</b>
<b>MLA00–0023</b>	<b>A... / E...</b>
<b>MLA00–0024</b>	
<b>MLA00–0025 BI.1</b>	
<b>MLA00–0025 BI.2</b>	
<b>MLA00–0026</b>	
<b>MLA00–0027</b>	
<b>MLA00–0028</b>	<b>ABGA</b>
<b>MLA00–0029</b>	
<b>MLA00–0031</b>	<b>A... / E...</b>
<b>MLA00–0032</b>	
<b>MLA00–0033</b>	
<b>MLA00–0034</b>	
<b>MLA00–0035</b>	
<b>MLA00–0036</b>	
<b>MLA00–0037</b>	<b>ANWA</b>
<b>MLA00–0038</b>	
<b>MLA00–0061</b>	<b>A... / E...</b>
<b>MLA00–0062</b>	
<b>MLA00–0063</b>	
<b>MLA00–0067</b>	
<b>MLA00–0093</b>	
<b>MLA00–0103</b>	
<b>MLA00–0104</b>	<b>A..., Medium–voltage</b>
<b>MLA00–0105</b>	
<b>MLA28–1002</b>	
<b>MLA28–1003</b>	
<b>MLA28–1008</b>	
<b>MLA28–1009</b>	
<b>MLA31–1002</b>	
<b>MLA31–1003</b>	
<b>MLA31–1011</b>	
<b>MLA31–1012</b>	

Dimension drawing	for series
<b>MLD00–0023 BI.1</b>	<b>D...</b>
<b>MLD00–0024 BI.1</b>	
<b>MLD00–0025 BI.1</b>	
<b>MLD00–0026</b>	
<b>MLD00–0027</b>	
<b>MLD00–0028</b>	<b>DBGW</b>
<b>MLD00–0029</b>	
<b>MLD00–0030</b>	<b>D...</b>
<b>MLD00–0031</b>	
<b>MLD00–0032</b>	
<b>MLD00–0033</b>	
<b>MLD00–0034</b>	
<b>MLD00–0035</b>	
<b>MLD00–0036</b>	<b>DNWW</b>
<b>MLD00–0037</b>	
<b>MLD00–0038</b>	<b>D...</b>
<b>MLD00–0061</b>	
<b>MLD00–0062</b>	
<b>MLD00–0063</b>	<b>D..., Medium–voltage</b>
<b>MLD28–1001</b>	
<b>MLD28–1002</b>	
<b>MLD28–1004</b>	
<b>MLD28–1005</b>	
<b>MLD31–1003</b>	
<b>MLD31–1004</b>	<b>DNGW, Preferred series</b>
<b>MLD31–1005</b>	
<b>MLD31–1006</b>	
<b>MVD00–0001</b>	
<b>MVD00–0002</b>	
<b>MVD00–0003</b>	
<b>MVD00–0004</b>	
<b>MVD00–0005</b>	
<b>MVD00–0007</b>	
<b>Order–Checklist</b>	<b>For Motors</b>



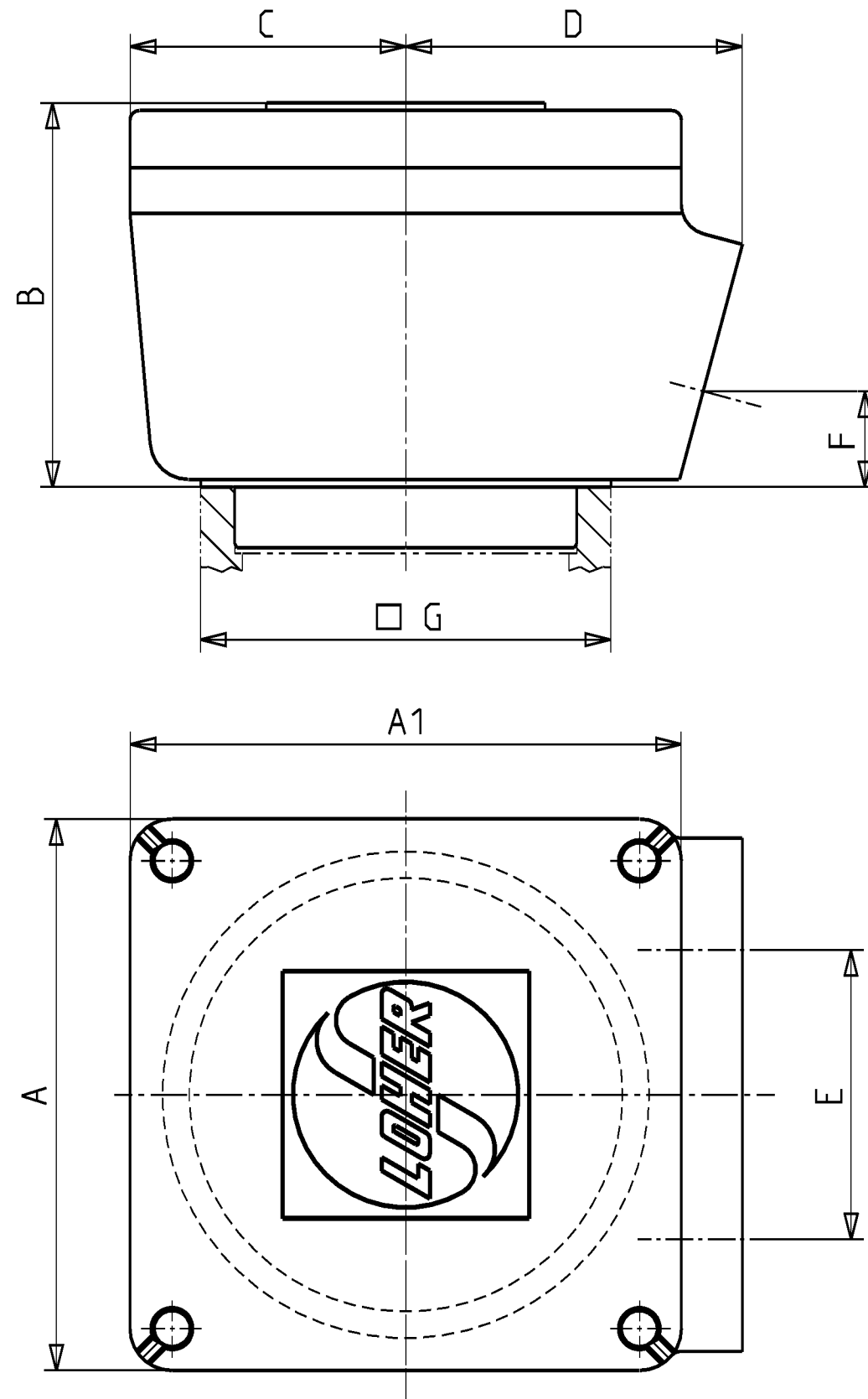
wahlweise bei Baugröße 200-315S-M  
alternatively at frame size 200-315S-M



Baugröße Frame size	A	A1	B	C	D	D1	E	F	G	$\alpha^\circ$
71-80	137	137	84	68.5	73	-	65	41	107	0°
90-112	170	170	97.5	85	80	-	85	51	117	
132-160	181	181	100	90.5	90	-	85	38	130	
180	235	264	130	117.5	128	-	108	62.5	186	
200-250	250	250	166	125	181	91	110	87	210	15°
280-315S-M	295	295	229	147.5	280	209	134	118.5	255	20°
315L-450	385	385	283	192.5	255.5	225	113	147	330	10°

Tab: BG132-180 überarbeitet	
Änderungs-Bemerkung Description of change	
a	Änd.-Index Change index

<b>FLENDER LOHER</b> <small>Änderungen nur im CAD-E vornehmen.</small>				Erstellt Compiled Datum Date		Letzte Änderung Last change Datum Date		Klemmenkasten EEx e II Terminal box EEx e II f. TYP DNG./DNS. 71-450				Zeichnung-Nr. Drawing No. <b>M 11833B</b>		Blatt Sheet	Sprache Language <b>DE</b>
														Letzter Änd.-Index Last change index <b>a</b>	Format DIN A Size DIN A <b>3</b>
Diese technische Unterlage hat gesetzlichen Schutz (DIN34). This technical document is proprietary (DIN34).		Bearbeitet, Designed Geprüft, Checked Teilklassifizierung Classification		29.11.00 29.11.00 20501	TMK18BA TMK1 Bezeichnung Drawing title	25.08.03 25.08.03 Maßblatt Dimension sheet	IMT26KA IMT2 MaBblatt Dimension sheet	Plotdatum Print date	Plotersteller Printed by	für Abteilung for Department	Plotstatus Print status				



Baugröße Frame size	A	A1	B	C	D	E	F	G	$\alpha^\circ$
71-80	145	145	101	72.5	89	80	25	108	15°
90-112								118	
132-180	233	233	161	116.5	165	128	76.5	186	20°
200-250	250	250	166	125	182	150	82	210	15°
280-315S-M	295	295	225.5	147.5	278	160	116	255	20°
315L-450	385	385	283	192.5	255.5	113	147	330	10°


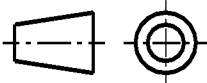
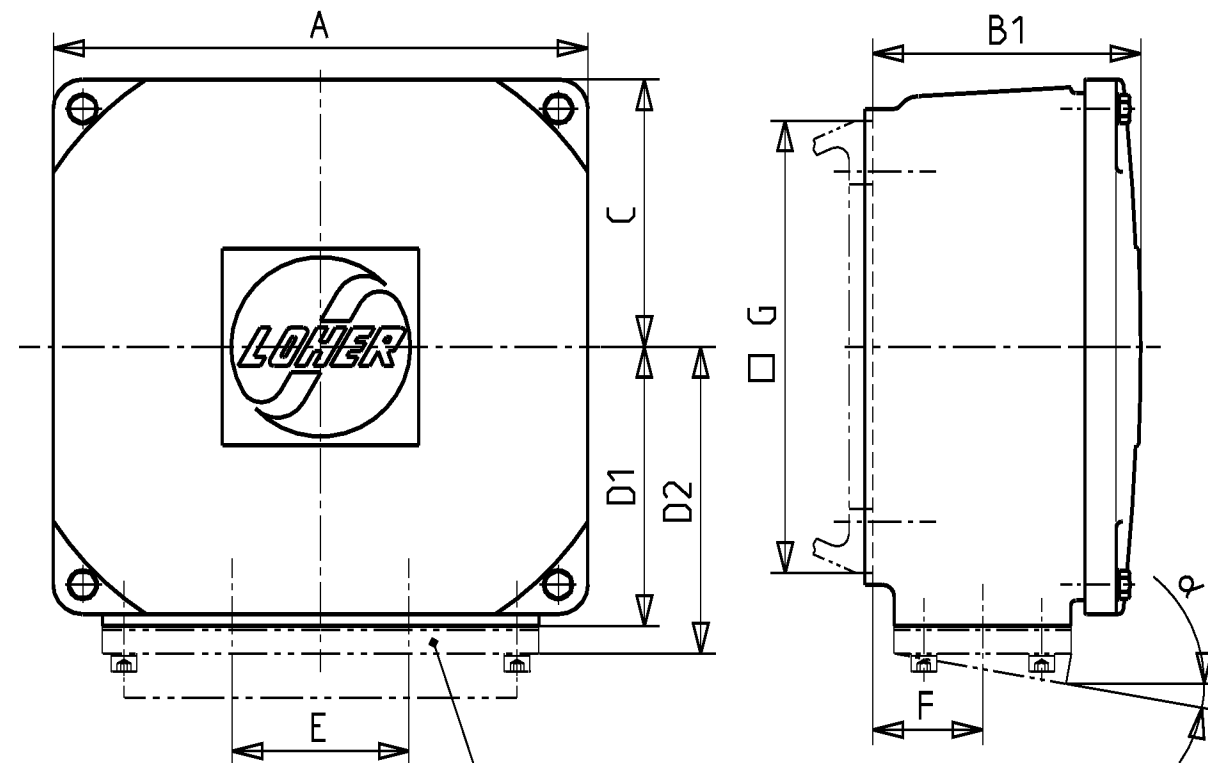
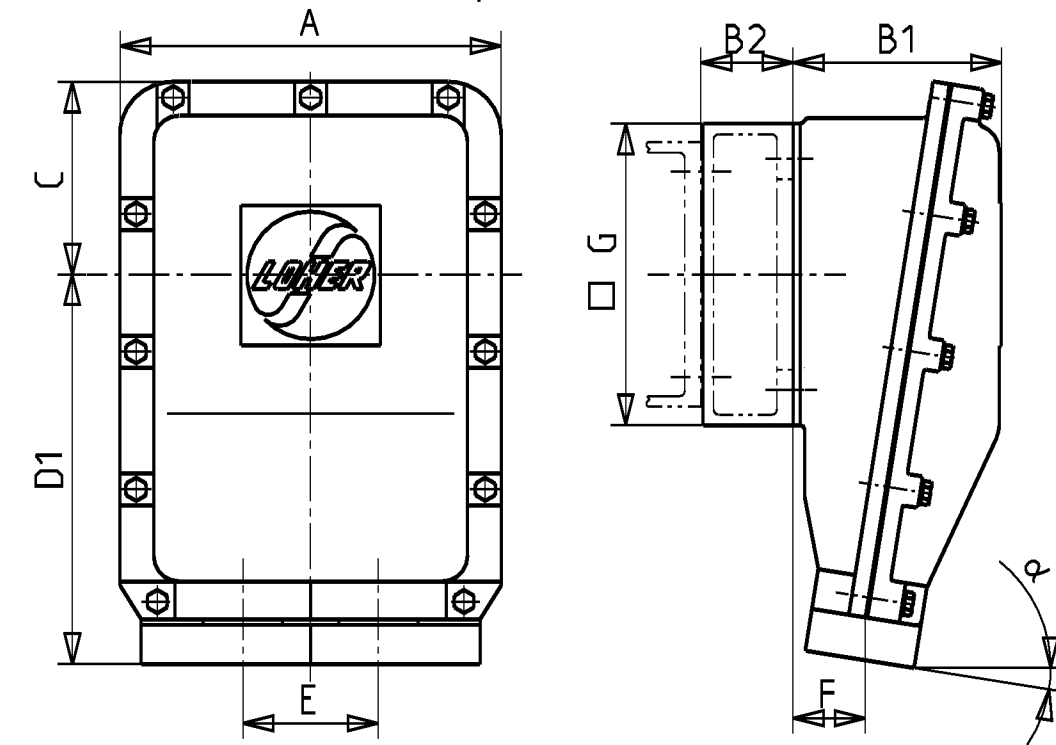
Änderungs-Bemerkung Description of change	Loher  Ein Unternehmen der A. Friedr. Flander AG				Erstellt Compiled		Letzte Änderung Last change		Klemmenkasten EEX d IIC Terminal box EEx d IIC F. TYP DNG./DNS. 71-450				Zeichnung-Nr. Drawing No. M11834 A		Blatt Sheet		Sprache Language DE			
	Änderungen nur im CAD-E vornehmen.				Datum Date		Name Name		Datum Date		Name Name									
	Diese technische Unterlage hat gesetzlichen Schutz (DIN34).		Bearbeitet, Designed		29.11.00		TMK18BA						Plotdatum Print date				Plotstatus Print status			
	This technical document is proprietary (DIN34).		Geprüft, Checked										Plottersteller Printed by				für Abteilung for Department			
Änd.-Index Change index			Teileklasse Classification		20501		Bezeichnung Drawing title		Maßblatt Dimension sheet											
1		2		3		4		5		6		7		8						

Bild I / picture I



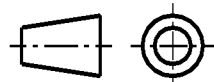
wahlweise mit Einführungsplatte ab BG180  
bushing plate optional up to frame size 180

Bild II / picture II



Rubrik rubric	Baugröße frame size	für Typ for type	Bild picture	A	B1	B2	C	D1	D2	E	F	G	$\alpha$	
1	090-100	A.../E...	I	118	75	-	59	56	-	44	30	64		
2	090-100	A.../E...-VIK	I	138	89	-	69	67	-	50	47	64		
3	112	A.../E...-VIK	I	138	79	-	69	67	-	50	37	110		
4	132-160	A.../E...-VIK	I	181	100	-	91	90	-	85	38	130		
5	180-200	A.../E...-VIK	I	220	123	-	110	110	124	104	49	128	0°	
6	225	A.../E...-VIK	I	220	123	-	110	110	124	104	49	192	15°	
7	250	A.../E...-VIK	I	272	137	-	136	-	156	90	53	230	15°	
8	280	A.../E...-VIK	I	279	149	-	140	-	162	90	55	250	0°	
9	315	A.../E...	I	279	149	-	140	-	162	90	55	250	0°	
10	315	VIK	II	360	197	87	182	356	-	104	62	285	9°	
11	355	A.../E...	I	360	252	-	190	-	308	120	103	285	0°	
12	355	VIK	II	360	249	-	182	346	-	104	62	285	9°	

**FLENDER  
LOHER**



Erstellt  
Compiled

Letzte Änderung  
Last change

Datum  
Date

Name  
Name

Datum  
Date

Name  
Name

Klemmenkasten / Terminal box  
Typ / type A.../E...

Zeichnung-Nr.  
Drawing No.

M 143666

Blatt  
Sheet

1

Sprache  
Language

DE

Diese technische Unterlage hat  
gesetzlichen Schutz (DIN34).

Bearbeitet, Designed  
Geprüft, Checked

02.11.00 FE25HE 16.04.02 IMT27SU  
06.11.00 FE24WE

Plotdatum  
Print date

Plottersteller  
Printed by

für Abteilung  
for Department

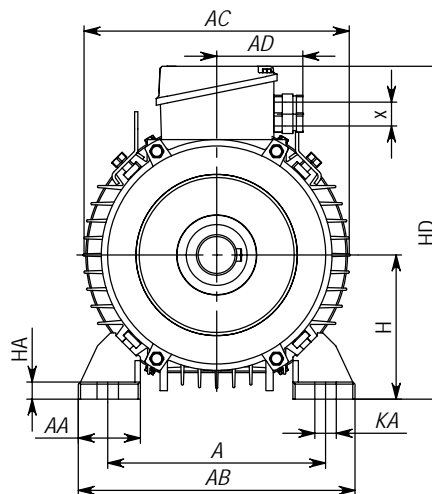
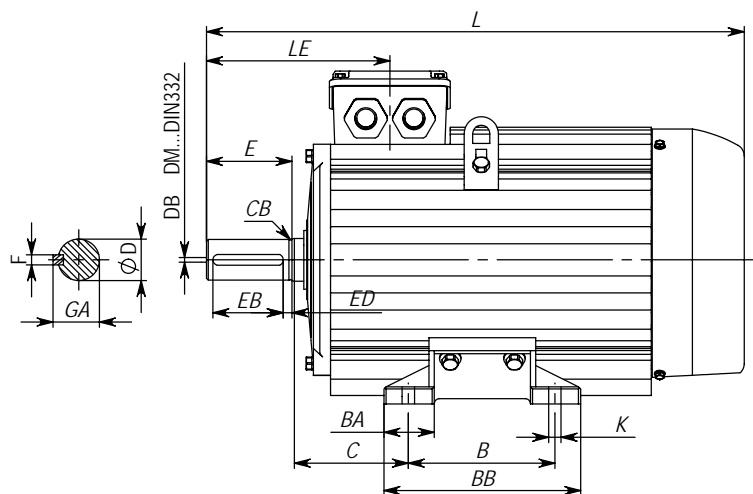
Plotstatus  
Print status

Letzter Änd.-Index  
Last change index

a

Format DIN A  
Size DIN A

3



Paßfeder DIN 6885  
Toleranz für Wellenende  $\phi$  28 ISO j6;  
ab  $\phi$  38 ISO k6; über  $\phi$  50 ISO m6.

Klemmenkasten um je 90° drehbar für BG 71 - 180  
Klemmenkasten um je 180° drehbar für BG 200.


*Schutzdeckel nur bei Bauform IM V5 auf besondere Bestellung*

*Key to DIN 6885*  
*Shaft end tolerance up to  $\phi$  28 ISO j6;*  
*up to  $\phi$  38 ISO k6; from  $\phi$  50 ISO m6.*

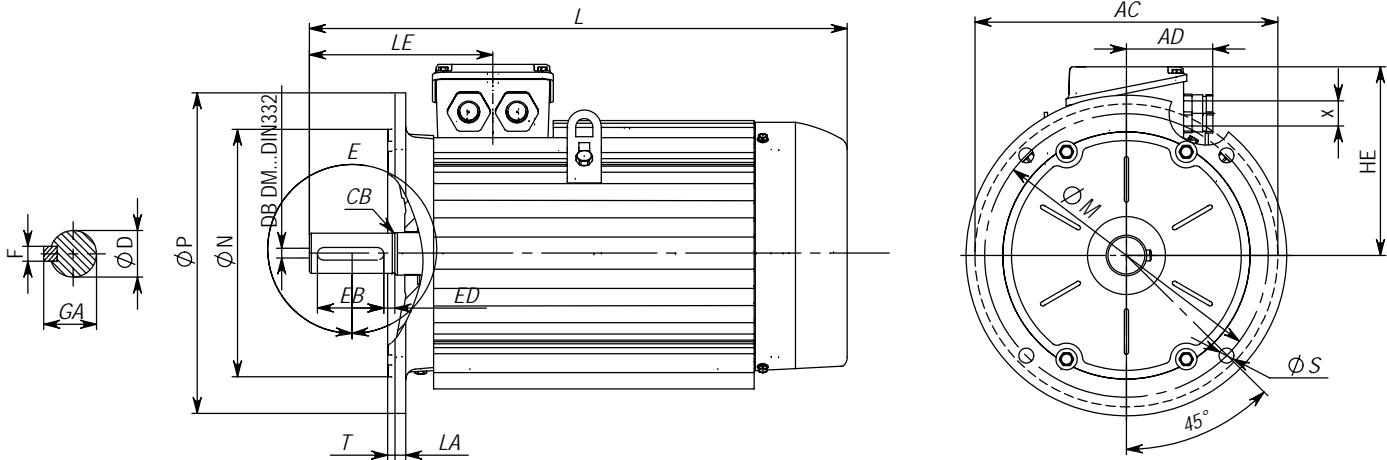
*Terminal box can be turned 90° in each direction for frame size 71 - 180. Terminal box can be turned 180° for frame size 200.*

*Protection hood only with mounting IM V5 upon special request on order.*

Baugroesse Frame size	Polzahl Number of poles	A	AA	AB	AC	AD	B	BA	BB	C	D	DB	E	EB	ED	CB	F	GA	H	HA	HD	K	KA	L	LE	x
071B...	2:4	112	26	138	150	76	90	25	112	45	14	-	30	25	2	1.0	5	16	71	7	186	7	10	241	104	2xM25x1.5
080BB	2:4	125	34	155	150	76	100	32	130	50	19	M6	40	32	3	1.0	6	21.5	80	8	195	10	12	271	109	2xM25x1.5
080BC	2:4	125	34	155	150	76	100	32	130	50	19	M6	40	32	3	1.0	6	21.5	80	8	195	10	12	291	109	2xM25x1.5
090SB	2:4	140	36	174	170	76	100	32	130	56	24	M8	50	40	5	1.0	8	27	90	10	215	10	12	300	129	2xM25x1.5
090LB	2	140	36	174	170	76	125	32	155	56	24	M8	50	40	5	1.0	8	27	90	10	215	10	12	350	129	2xM25x1.5
090LB	4	140	36	174	170	76	125	32	155	56	24	M8	50	40	5	1.0	8	27	90	10	215	10	12	320	129	2xM25x1.5
100LB	2:4	160	43	196	170	76	140	43	176	63	28	M10	60	50	5	1.0	8	31	100	12	225	12	16	380	137	2xM25x1.5
100LC	4	160	40	200	210	87	140	45	176	63	28	M10	60	50	5	1.0	8	31	100	9	265	12	16	410	150	2xM32x1.5
112MB	2	190	43	236	210	87	140	43	176	70	28	M10	60	50	5	1.0	8	31	112	12	277	12	17	410	150	2xM32x1.5
112MB	4	190	43	236	210	87	140	43	176	70	28	M10	60	50	5	1.0	8	31	112	12	277	12	17	430	150	2xM32x1.5
132SB	2:4	216	58	260	250	87	140	47	184	89	38	M12	80	70	5	1.0	10	41	132	13	310	12	14	475	172	2xM32x1.5
132SC	2	216	58	260	250	87	140	47	184	89	38	M12	80	70	5	1.0	10	41	132	13	310	12	14	505	172	2xM32x1.5
132MB	4	216	58	260	250	87	178	47	222	89	38	M12	80	70	5	1.0	10	41	132	13	310	12	14	505	172	2xM32x1.5
160MB	2:4	254	53	297	350	125	210	52	253	108	42	M16	110	100	5	1.0	12	45	160	19	405	15	19	588	252	2xM40x1.5
160MD	2	254	53	297	350	125	210	52	253	108	42	M16	110	100	5	1.0	12	45	160	19	405	15	19	628	252	2xM40x1.5
160LB	2	254	53	297	350	125	254	52	297	108	42	M16	110	100	5	1.0	12	45	160	19	405	15	19	641	252	2xM40x1.5
160LB	4	254	53	297	350	125	254	52	297	108	42	M16	110	100	5	1.0	12	45	160	19	405	15	19	628	252	2xM40x1.5
180MB	2	279	66	323	350	125	241	52	284	121	48	M16	110	100	5	1.0	14	51.5	180	22	425	15	19	678	252	2xM40x1.5
180MB	4	279	66	323	350	125	241	52	284	121	48	M16	110	100	5	1.0	14	51.5	180	22	425	15	19	641	252	2xM40x1.5
180LB	4	279	66	323	350	125	279	52	323	121	48	M16	110	100	5	1.0	14	51.5	180	22	425	15	19	678	252	2xM40x1.5
200L	2	318	77	385	370	190	305	65	368	133	55	M20	110	100	5	1.6	16	59	200	25	490	19	19	828	261	2xM50x1.5
200L	4	318	77	385	370	190	305	65	368	133	55	M20	110	100	5	1.6	16	59	200	25	490	19	19	748	261	2xM50x1.5

<b>FLENDER</b> <b>LOHER</b>		Erstellt Compiled		Letzte Änderung Last change		Drehstrommotoren mit Käfigläufer Three-phase motors with squirrel cage-rotor Typ/type: BNCA Bauform/mounting: IM B3; IM V5; IM V6 DIN 42673				Zeichnung-Nr. Drawing No.		Blatt Sheet	Sprache Language de/en
		Datum Date	Name Name	Datum Date	Name Name					MEB00 - 0006			
Änderungen nur im CAD-E vornehmen.		23.01.04	OGK 19			Plotdatum Print date	Plotsteller Printed by	für Abteilung for Department	Plotstatus Print status			Letzter Änd.-Index Last change index	Format DIN Size DIN 3
Diese technische Unterlage hat gesetzlichen Schutz (DIN34).	Bearbeitet, Designed Geprüft, Checked												
This technical document is proprietary (DIN34).	Teileklasse Classification 20501	Maßblatt Dimension sheet											

		Änderungs-Bemerkung Description of change
		Änd.-Index Change index



Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene

Passung bis N =  $\Phi$  250 ISO j6; ab N =  $\Phi$  300 ISO h6.

Paßfeder DIN 6885  
Toleranz für Wellenende  $\Phi$  28 ISO j6; ab  $\Phi$  38 ISO k6; über  $\Phi$  50 ISO m6.

Klemmenkasten um je 90° drehbar für BG 71 - 180  
Klemmenkasten um je 180° drehbar für BG 200.

Schutzdeckel nur bei Bauform IM V1 auf besondere Bestellung

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder

Fit up to N =  $\Phi$  250 ISO j6; from N =  $\Phi$  300 ISO h6.

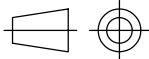
Key to DIN 6885  
Shaft end tolerance up to  $\Phi$  28 ISO j6; up to  $\Phi$  38 ISO k6; from  $\Phi$  50 ISO m6.

Terminal box can be turned 90° in each direction for frame size 71 - 180.  
Terminal box can be turned 180° for frame size 200.

Protection hood only with mounting IM V1 upon special request on order.

Baugrouse Frame size	Polzahl Number of poles	Flansch Flange	AC	AD	D	DB	E	EB	ED	CB	F	GA	HE	L	LA	LE	M	N	P	S	T	x
071B...	2;4	FF130	150	76	14	-	30	25	2	1.0	5	16	115	241	9	104	130	110	160	10	3.5	2xM25x1.5
080BB	2;4	FF165	150	76	19	M6	40	32	3	1.0	6	21.5	115	271	10	109	165	130	200	12	3.5	2xM25x1.5
080BC	2;4	FF165	150	76	19	M6	40	32	3	1.0	6	21.5	115	291	10	109	165	130	200	12	3.5	2xM25x1.5
090SB	2;4	FF165	170	76	24	M8	50	40	5	1.0	8	27	125	300	10	129	165	130	200	12	3.5	2xM25x1.5
090LB	2	FF165	170	76	24	M8	50	40	5	1.0	8	27	125	350	10	129	165	130	200	12	3.5	2xM25x1.5
090LB	4	FF165	170	76	24	M8	50	40	5	1.0	8	27	125	320	10	129	165	130	200	12	3.5	2xM25x1.5
100LB	2;4	FF215	170	76	28	M10	60	50	5	1.0	8	31	125	380	11	137	215	180	250	15	4.0	2xM25x1.5
100LC	4	FF215	210	87	28	M10	60	50	5	1.0	8	31	165	410	10	150	215	180	250	15	4.0	2xM32x1.5
112MB	2	FF215	210	87	28	M10	60	50	5	1.0	8	31	165	410	10	150	215	180	250	15	4.0	2xM32x1.5
112MB	4	FF215	210	87	28	M10	60	50	5	1.0	8	31	165	430	10	150	215	180	250	15	4.0	2xM32x1.5
132SB	2;4	FF265	250	87	38	M12	80	70	5	1.0	10	41	178	475	12	172	265	230	300	15	4.0	2xM32x1.5
132SC	2	FF265	250	87	38	M12	80	70	5	1.0	10	41	178	505	12	172	265	230	300	15	4.0	2xM32x1.5
132MB	4	FF265	250	87	38	M12	80	70	5	1.0	10	41	178	505	12	172	265	230	300	15	4.0	2xM32x1.5
160MB	2;4	FF300	350	125	42	M16	110	100	5	1.0	12	45	245	588	13	252	300	250	350	18	5.0	2xM40x1.5
160MD	2	FF300	350	125	42	M16	110	100	5	1.0	12	45	245	628	13	252	300	250	350	18	5.0	2xM40x1.5
160LB	2	FF300	350	125	42	M16	110	100	5	1.0	12	45	245	641	13	252	300	250	350	18	5.0	2xM40x1.5
160LB	4	FF300	350	125	42	M16	110	100	5	1.0	12	45	245	628	13	252	300	250	350	18	5.0	2xM40x1.5
180MB	2	FF300	350	125	48	M16	110	100	5	1.0	14	51.5	245	678	13	252	300	250	350	18	5.0	2xM40x1.5
180MB	4	FF300	350	125	48	M16	110	100	5	1.0	14	51.5	245	641	13	252	300	250	350	18	5.0	2xM40x1.5
180LB	4	FF300	350	125	48	M16	110	100	5	1.0	14	51.5	245	678	13	252	300	250	350	18	5.0	2xM40x1.5
200L	2	FF350	370	190	55	M20	110	100	5	1.6	16	59	290	828	15	261	350	300	400	19	5.0	2xM50x1.5
200L	4	FF350	370	190	55	M20	110	100	5	1.6	16	59	290	748	15	261	350	300	400	19	5.0	2xM50x1.5

**FLENDER  
LOHER**



Erstellt  
Compiled

Letzte Änderung  
Last change

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: BNCA.  
Bauform/mounting: IM B5; IM V1; IM V3 DIN 42677

Zeichnung-Nr.  
Drawing No.

MEB00 - 0007

Blatt  
Sheet

Sprache  
Language  
de/en

Änderungen nur im  
CAD-E-vornehmen.

Diese technische Unterlage hat  
gesetzlichen Schutz (DIN34).

This technical document  
is proprietary (DIN34).

Bearbeitet, Designed

Datum  
Date

Name  
Name

Datum  
Date

Name  
Name

Geprüft, Checked

Datum  
Date

Name  
Name

Teilklasse  
Classification

20501

Bezeichnung  
Drawing title

Maßblatt  
Dimension sheet

Plotdatum  
Print date

Plotersteller  
Printed by

für Abteilung  
for Department

Plotstatus  
Print status

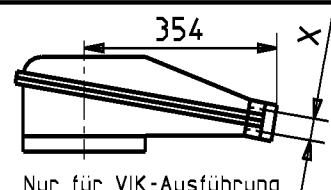
Letzter Änd.-Index  
Last change index

f

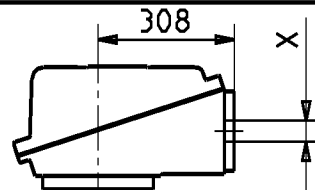
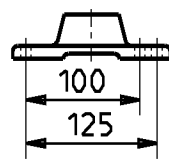
Format DIN A  
Size DIN A

3

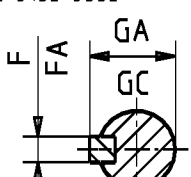




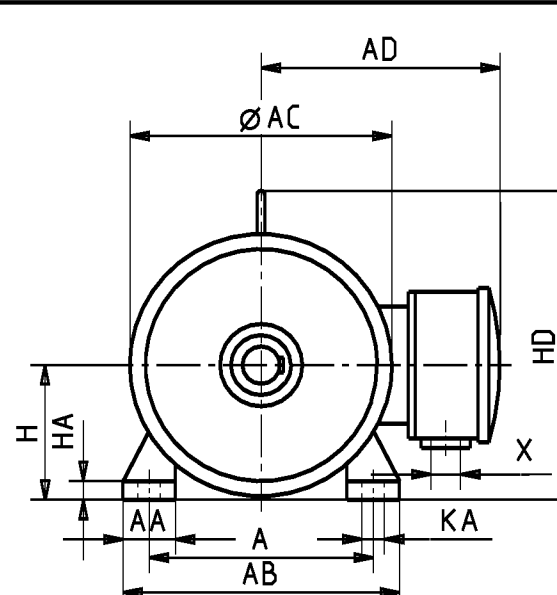
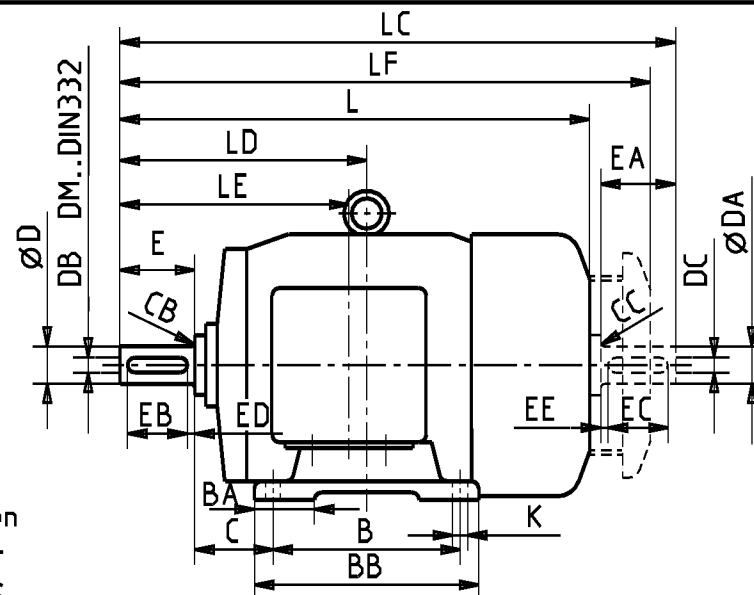
Nur für VIK-Ausführung  
bei Baugröße 315-355  
Only for VIK-design  
for frame size 315-355



Klemmenkasten für  
Baugröße 315L-355L  
Terminal box for  
frame size 315L-355L



Gehäusefuß der Baugröße -090L, mit zusätzlichen  
Bohrungen auf BS entsprechend Baulänge -090S.  
Mounting foot of frame size -090L, with extra  
holes at NDE corresponding to frame size -090S.



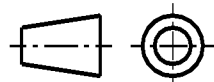
Paßfeder DIN 6885  
Toleranz für Wellenende bis Ø 28 ISO j6,  
ab Ø 38 ISO k6, über Ø 50 ISO m6  
Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V5 in Schutzart  
erhöhte Sicherheit EExe oder auf besondere Bestellung  
Baugröße 90 ohne Tragöse  
Klemmenkasten wahlweise links von AS

Key to DIN 6885  
Shaft end tolerance up to Ø 28 ISO j6,  
up to Ø 38 ISO k6, from Ø 50 ISO m6  
Terminal box can be turned 90° in each direction  
Protection hood only with mounting Im V5 in increased  
safety EExe or upon special request on order  
Frame size 90 without eye bolt  
Terminal box optionally left hand side of DE

- 1) 2. Wellenende - 2. Shaft end: DA=24, DC=M8, EA=50, GC=27, EC=40, CC=0.4  
2) Typ-Type: ANG./ENG.  
3) Typ-Type: AMG./EMG.  
4) 315...02: alternativ geschweißt  
alternatively welded  
5) Abweichende Gewindegrößen nach Kunden-Auftrag  
other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	AD <sup>2)</sup>	AD <sup>3)</sup>	B	BA	BB	C	D DA	DB DC	E EA	EB EC	ED EE	CB CC	F FA	GA GC	H	HA	HD	K	KA	L	LC	LD	LE	LF	X <sup>5)</sup>
090L	2-8	140	40	180	186	162	176	125	62	155	56	24	M8	50	40	5	0.4	8	27	90	13	183	10.5	12	324.5	380.5	168.5	168.5	361.5	1xM25x1.5
100L	2-8	160	45	205	206	171	185	140	45	170	63	28 <sup>1)</sup>	M10 <sup>1)</sup>	60 <sup>1)</sup>	50 <sup>1)</sup>	5	0.6 <sup>1)</sup>	8	31 <sup>1)</sup>	100	15	233	12	18	382.5	443	193	193	423	1xM32x1.5
112M	2-8	190	45	230	229	191	191	140	45	176	70	28	M10	60	50	5	0.6	8	31	112	16	258	12	18	389	453	200	200	435	2xM32x1.5
132S	2-8	216	50	260	270	232	232	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	16	306	12	18	458	556	239	239	516	2xM32x1.5
132M	2-8	216	50	260	270	232	232	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	16	306	12	18	496	594	258	258	554	2xM32x1.5
160M	2 4-8	254	60	310	310	258	258	210	60	256	108	42	M16	110	100	5	1	12	45	160	20	356	15	22	628 580	756	323	323	735 619	2xM40x1.5
160L	2 4-8	254	60	310	310	258	258	254	60	300	108	42	M16	110	100	5	1	12	45	160	20	356	15	22	672 624	800	345	345	779 663	2xM40x1.5
180M	2 4-8	279	70	345	341	297	297	241	80	300	121	48	M16	110	100	5	0.6	14	51.5	180	25	402	15	25	696 646	832	351.5	351.5	802.5 690.5	2xM40x1.5
180L	2 4-8	279	70	345	341	297	297	279	80	338	121	48	M16	110	100	5	0.6	14	51.5	180	25	402	15	25	734 684	870	370.5	370.5	840.5 728.5	2xM40x1.5
200L	2-8	318	80	400	392	325	325	305	90	365	133	55	M20	110	100	5	1.6	16	59	200	30	455	20	26	766	916	395.5	395.5	840.5	2xM50x1.5
225S	2 4-8	356	90	450	431	353	353	286	100	370	149	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	225	32	501	20	26	788 818	938 998	402 432	402 432	872 902	2xM50x1.5
225M	2 4-8	356	90	450	431	353	353	311	100	395	149	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	225	32	501	20	26	813 843	963 1023	414.5 444.5	414.5 444.5	896.5 926.5	2xM50x1.5
250M	2 4-8	406	100	505	489	404	404	349	100	420	168	60 65	M20	140	125	7.5	1.6	18 18	64 69	250	35	563	25	36	937	1110	482.5	482.5	1037.5	2xM63x1.5
280S	2 4-8	457	110	570	550	449	449	368	120	470	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	643	26	38	1004	1184	514	514	1116	2xM63x1.5
280M	2 4-8	457	110	570	550	449	449	419	120	520	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	643	26	38	1055	1235	539.5	539.5	1166.5	2xM63x1.5
315S	2 4-8	508	120	630	622	494	631	406	130	520	216	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	713	30	40	1110 1200	1347 1420	559 589	559 589	1273 1310	2xM63x1.5
315M	2 4-8	508	120	630	622	494	631	457	130	570	216	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	713	30	40	1161 1251	1398 1471	584.5 614.5	584.5 614.5	1324 1361.5	2xM63x1.5
315L	2 4-8	508	120	630	622	564	564	508	130	621	216	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	713	30	40	1281 1371	1524 1591	610 640	584.5 614.5	-	2xM63x1.5
355M	2 4-8	610	120	730	700	640	640	560	150	650	254	75 90	M20 M24	140 170	125 140	7.5 15	1.6 2.5	20 25	79.5 95	355	50	819	30	40	1410 1440	1600 1665	674 704	674 704	-	2xM63x1.5
355L	2 4-8	610	120	730	700	640	640	630	150	720	254	75 90	M20 M24	140 170	125 140	7.5 15	1.6 2.5	20 25	79.5 95	355	50	819	30	40	1480 1510	1670 1735	709 739	709 739	-	2xM63x1.5

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Erstellt  
Compiled

Letzte Änderung  
Last change

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: A.G./E.G. 4) A.S./E.S.  
Bauform/mounting: IM B3, IM V5, IM V6 DIN 42673

Zeichnung-Nr.  
Drawing No.

MLA00-0001

Blatt  
Sheet

Sprache  
Language

de/en

Diese technische Unterlage hat  
gesetzlichen Schutz (DIN34).

Bearbeitet, Designed  
Geprüft, Checked

15.07.02 Schiestl K. 02.12.03 IMT26KA  
15.07.02 IMT2HK 02.12.03 IMT

Plotdatum  
Print date

Plottersteller  
Printed by

für Abteilung  
for Department

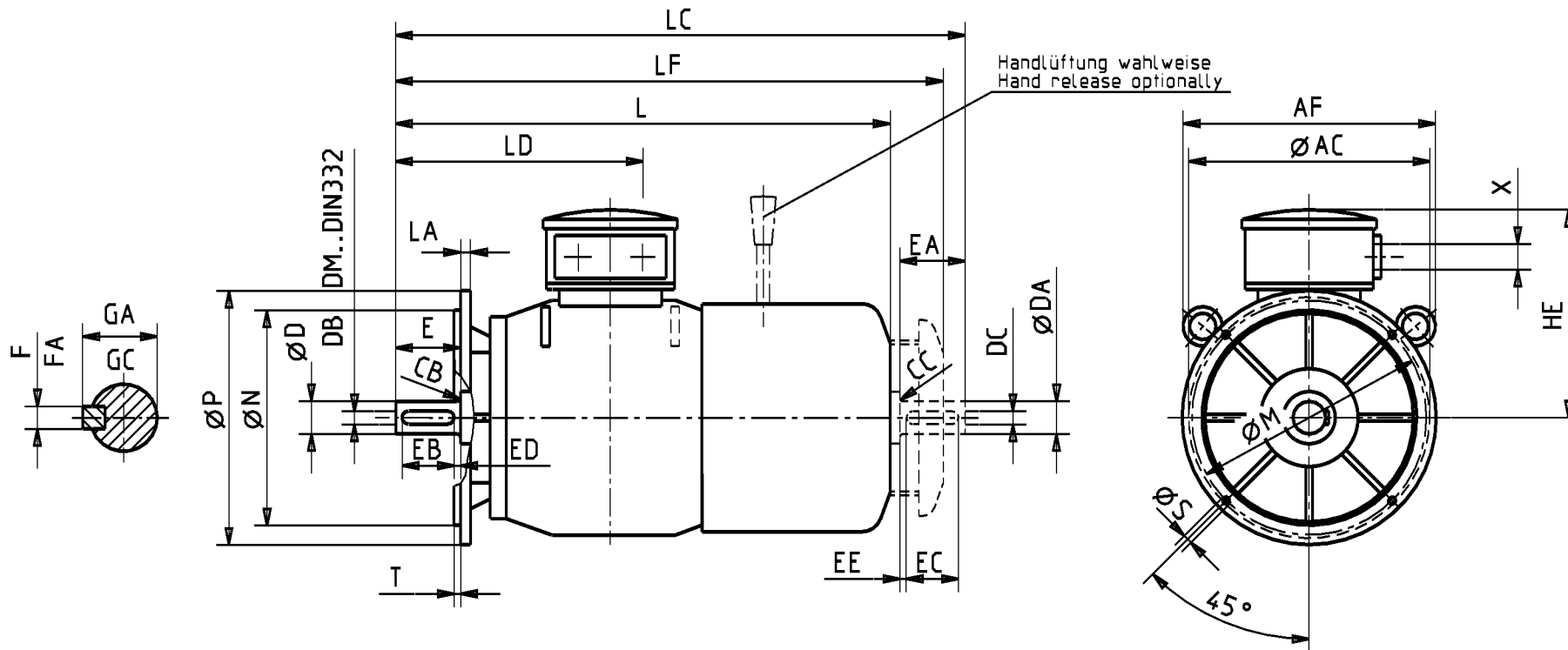
Plotstatus  
Print status

Letzter Änd.-Index  
Last change index

C

Format DIN A  
Size DIN A

3



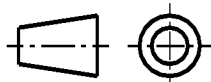
Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
Passung bis N= Ø 250 ISO j6, ab N= Ø 300 ISO h6  
Passfeder DIN 6885  
Passung für Wellenende bis Ø 28 ISO j6, ab Ø 38 ISO k6, über Ø 50 ISO m6  
Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V18 in Schutzart erhöhte Sicherheit EExe oder auf besondere Bestellung  
Baugröße 90 ohne Tragöse  
Bauformen IM V18, IM V19, ab Baugröße 100: 2 Tragösen gegenüberliegend

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
Fit up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
Key to DIN 6885  
Shaft end fit up to Ø 28 ISO j6, up to Ø 38 ISO k6, from Ø 50 ISO m6  
Terminal box can be turned 90° in each direction  
Protection hood only with mounting IM V18 in increased safety EExe or upon special request on order  
Frame size 90 without eye bolt  
Mountings IM V18, IM V19, from frame size 100: 2 eye bolt opposite

1) Abweichende Gewindegrößen nach Kunden-Auftrag  
other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	AC	AF	HE	L	LA	LC	LD	LF	M	N	P	S	T	X <sup>1)</sup>	Flansch wahlweise/flange optionally						1. Wellenende/1st shaft end								2. Wellenende/2nd shaft end								Bremse/brake	
																LA	M	N	P	S	T	D	DB	E	EB	ED	CB	F	GA	DA	DC	EA	EC	EE	CC	FA	GC	Nm	Größe/size
090L.	2-8	186	-	162	389	10	435	168.5	426	115	95	140	M8	3	1xM25x1.5	8 10	100 130	80 110	120 160	M6 M8	3 3.5	24	M8	50	40	5	0.4	8	27	19	M6	40	32	4	0.4	6	21.5	16 32	10 12
100L.	2-8	206	213	171	455	10	514	193	495	130	110	160	M8	3.5	1xM32x1.5	10 12	115 165	95 130	140 200	M8 M10	3 3.5	28	M10	60	50	5	0.6	8	31	24	M8	50	40	5	0.4	8	27	32	12
112M.	2-8	229	211	191	467	10	527	200	513	130	110	160	M8	3.5	2xM32x1.5	12	165	130	200	M10	3.5	28	M10	60	50	5	0.6	8	31	24	M8	50	40	5	0.4	8	27	32 60	12 14
132S.	2-8	270	297	232	568	11	646	239	626	215	180	250	M12	4	2xM32x1.5	12	265	230	300	M12	4	38	M12	80	70	5	0.6	10	41	28	M10	60	50	5	0.4	8	31	60	14
																																						60	14
																																						80	16
132M.	2-8	270	297	232	606	11	684	258	664	215	180	250	M12	4	2xM32x1.5	12	265	230	300	M12	4	38	M12	80	70	5	0.6	10	41	28	M10	60	50	5	0.4	8	31	150	18
																																						60	14
																																						80	16
160M.	2-8	310	293	258	719	12	847	323	779	265	230	300	M12	4	2xM40x1.5	11 13	215 300	180 250	250 350	M12 M16	4 5	42	M16	110	100	5	1	12	45	42	M16	110	100	5	1	12	45	150	18
																260	20																						
160L.	2-8	310	293	258	763	12	891	345	823	265	230	300	M12	4	2xM40x1.5	11 13	215 300	180 250	250 350	M12 M16	4 5	42	M16	110	100	5	1	12	45	42	M16	110	100	5	1	12	45	150	18
																260	20																						
180M.	2-8	341	334	297	774	13	909	351.5	819	300	250	350	M16	5	2xM40x1.5	12	265	230	300	M12	4	48	M16	110	100	5	0.6	14	51.5	42	M16	110	100	5	1	12	45	150	18
																																						260	20
180L.	2-8	341	334	297	812	13	947	370.5	857	300	250	350	M16	5	2xM40x1.5	12	265	230	300	M12	4	48	M16	110	100	5	0.6	14	51.5	42	M16	110	100	5	1	12	45	150	18
																																						260	20

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Letzte Änderung  
Last change

Datum Date	Name Name	Datum Date	Name Name
15.07.02	Schiestl K.	04.12.03	IMT26KA
15.07.02	IMT2HK	04.12.03	IMT

Drehstrommotor mit Käfigläufer  
Three-phase-motors with squirrel cage-rotor  
Typ/type: ABGA  
Bauform/mounting: IM B14, IM V18, IM V19 DIN 42677

Zeichnung-Nr.  
Drawing No.

MLA00-0002

Blatt  
Sheet

Sprache  
Language

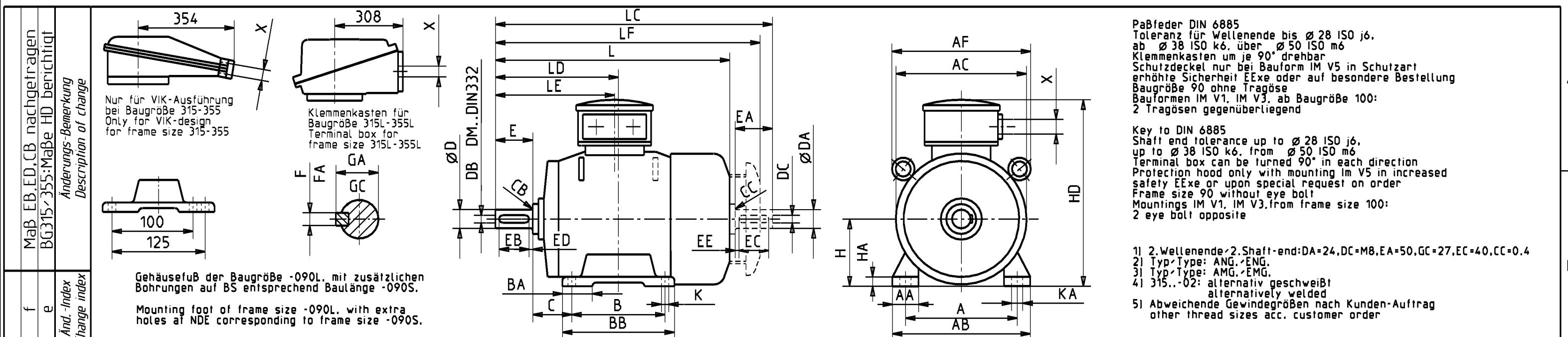
de/en

Letzter Änd.-Index  
Last change index

b

Format DIN A  
Size DIN A

3



Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	AF	B	BA	BB	C	D DA	DB DC	E EA	EB EC	ED EE	CB CC	F FA	GA GC	H	HA	HD <sup>2)</sup>	HD <sup>3)</sup>	K	KA	L	LC	LD	LF	LE	X <sup>5)</sup>
090L	2-8	140	40	180	186	-	125	62	155	56	24	M8	50	40	5	0.4	8	27	90	13	252	266	10.5	12	324.5	380.5	168.5	361.5	168.5	1xM25x1.5
100L	2-8	160	45	205	206	213	140	45	170	63	28 <sup>1)</sup>	M10 <sup>1)</sup>	60 <sup>1)</sup>	50 <sup>1)</sup>	5	0.6 <sup>1)</sup>	8	31 <sup>1)</sup>	100	15	271	285	12	18	382.5	443	193	423	193	1xM32x1.5
112M	2-8	190	45	230	229	211	140	45	176	70	28	M10	60	50	5	0.6	8	31	112	16	303	303	12	18	389	453	200	435	200	2xM32x1.5
132S	2-8	216	50	260	270	297	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	16	364	364	12	18	458	556	239	516	239	2xM32x1.5
132M	2-8	216	50	260	270	297	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	16	364	364	12	18	496	594	258	554	258	2xM32x1.5
160M	2 4-8	254	60	310	310	293	210	60	256	108	42	M16	110	100	5	1	12	45	160	20	418	418	15	22	628 580	756	323	735 619	323	2xM40x1.5
160L	2 4-8	254	60	310	310	293	254	60	300	108	42	M16	110	100	5	1	12	45	160	20	418	418	15	22	672 624	800	345	779 663	345	2xM40x1.5
180M	2 4-8	279	70	345	341	334	241	80	300	121	48	M16	110	100	5	0.6	14	51.5	180	25	477	477	15	25	696 646	832	351.5	802.5 690.5	351.5	2xM40x1.5
180L	2 4-8	279	70	345	341	334	279	80	338	121	48	M16	110	100	5	0.6	14	51.5	180	25	477	477	15	25	734 684	870	370.5	840.5 728.5	370.5	2xM40x1.5
200L	2 4-8	318	80	400	392	365	305	90	365	133	55	M20	110	100	5	1.6	16	59	200	30	525	525	20	26	766	916	395.5	840.5	395.5	2xM50x1.5
225S	2 4-8	356	90	450	431	417	286	100	370	149	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	225	32	578	578	20	26	788 818	938 998	402 432	872 902	402 432	2xM50x1.5
225M	2 4-8	356	90	450	431	417	311	100	395	149	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	225	32	578	578	20	26	813 843	963 1023	414.5 444.5	896.5 926.5	414.5 444.5	2xM50x1.5
250M	2 4-8	406	100	505	489	487	349	100	420	168	60 65	M20	140	125	7.5	1.6	18	64 69	250	35	654	654	25	36	937	1110	482.5	1037.5	482.5	2xM63x1.5
280S	2 4-8	457	110	570	550	609	368	120	470	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	729	729	26	38	1004	1184	514	1116	514	2xM63x1.5
280M	2 4-8	457	110	570	550	609	419	120	520	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	729	729	26	38	1055	1235	539.5	1166.5	539.5	2xM63x1.5
315S	2 4-8	508	120	630	622	644	406	130	520	216	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	809	935	30	40	1110 1200	1347 1420	559 589	1273 1310	559 589	2xM63x1.5
315M	2 4-8	508	120	630	622	644	457	130	570	216	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	809	935	30	40	1161 1251	1398 1471	584.5 614.5	1324 1361.5	584.5 614.5	2xM63x1.5
315L	2 4-8	508	120	630	622	644	508	130	621	216	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	996	996	30	40	1281 1371	1524 1591	610 640	-	584.5 614.5	2xM63x1.5
355M	2 4-8	610	120	730	700	635	560	150	650	254	75 90	M20 M24	140 170	125 140	7.5 15	1.6 2.5	20 25	79.5 95	355	50	1084	1096	30	40	1410 1440	1600 1665	674 704	-	674 704	2xM63x1.5
355L	2 4-8	610	120	730	700	635	630	150	720	254	75 90	M20 M24	140 170	125 140	7.5 15	1.6 2.5	20 25	79.5 95	355	50	1084	1096	30	40	1480 1510	1670 1735	709 739	-	709 739	2xM63x1.5

**FLENDER  
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Änderungen nur im CAD-E vornehmen.

Bearbeitet, Designed  
Geprüft, Checked  
Teileklasse 20501

Erstellt  
Compiled  
Datum  
Date

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Date

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This technical document is proprietary (DIN34).

Bezeichnung  
Drawing title  
Maßblatt  
Dimension sheet

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: A.G./E.G. 4) A.S./E.S.  
Bauform/mounting: IM B3, IM V5, IM V6 DIN 42673

Plotdatum  
Print date

Plotsteller  
Printed by

für Abteilung  
for Department

Plotstatus  
Print status

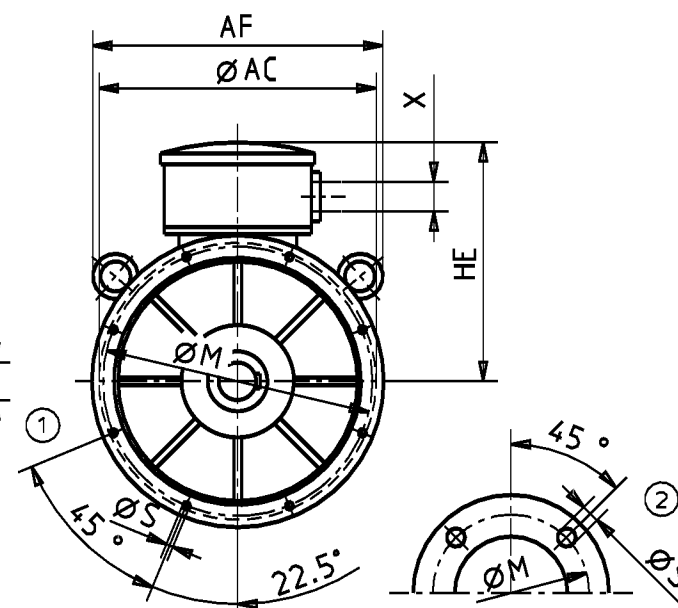
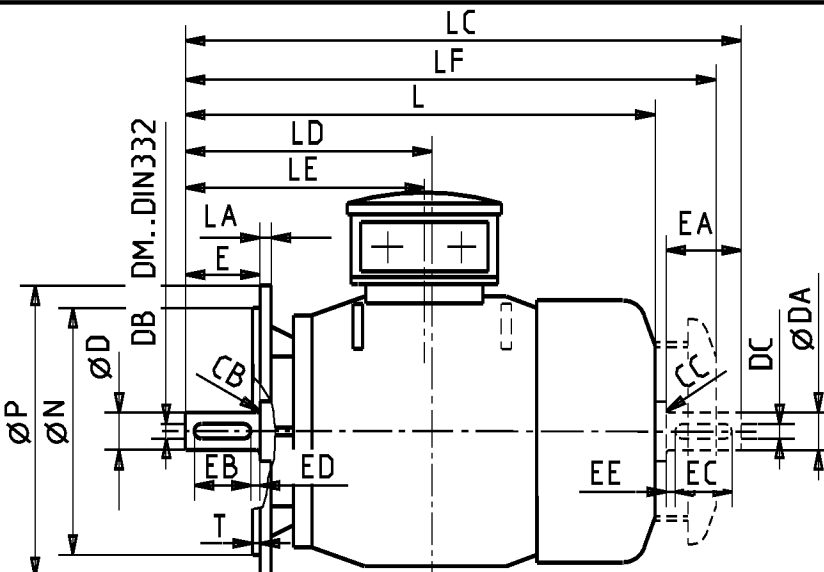
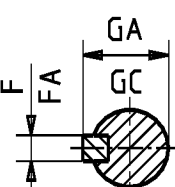
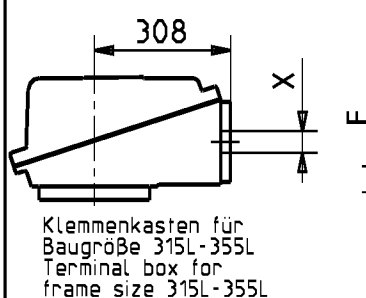
Zeichnung-Nr.  
Drawing No.  
MLA00-0023

Blatt  
Sheet

Sprache  
Language  
de/en

Letzter Änd.-Index  
Last change index  
f

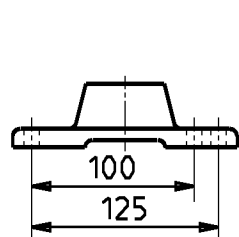
Format DIN A  
Size DIN A  
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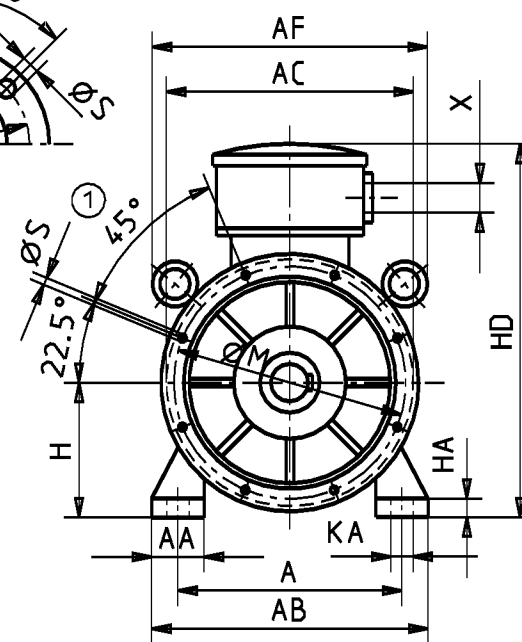
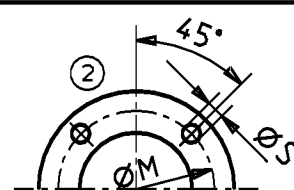
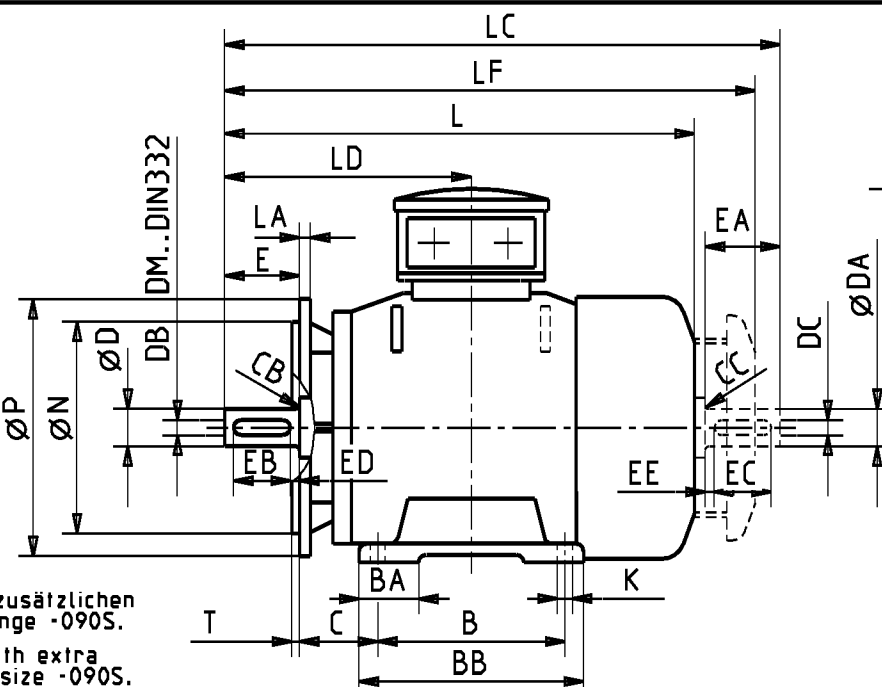
6) Abweichende Gewindegrößen nach Kunden-Auftrag  
other thread sizes acc. customer order

<div>FLENDER LOHER</div>		Erstellt Compiled		Letzte Änderung Last change		Drehstrommotor mit Käfigläufer Three-phase-motors with squirrel cage-rotor Typ/type: A.G./E.G. Bauform/mounting: IM B5, IM V1, IM V3 DIN 42677				Zeichnung-Nr. Drawing No.		Blatt Sheet	Sprache Language
Änderungen nur im CAD-E vornehmen.		Datum Date	Name Name	Datum Date	Name Name					MLA00-0024			
Diese technische Unterlage hat gesetzlichen Schutz (DIN34).  This technical document is proprietary (DIN34).	Bearbeitet, Designed	11.07.02	Schiestl K.	16.01.04	IMT26KA	Plotdatum Print date	Plotersteller Printed by	für Abteilung for Department	Plotstatus Print status	Letzter Änd.-Index Last change index	Format DIN A Size DIN A		
	Geprüft, Checked	11.07.02	IMT2HK	16.01.04	IMT2								
	Teileklasse Classification	20501	Bezeichnung Drawing title		Maßblatt Dimension sheet					j	3		

Nur für VIK-Ausführung  
bei Baugröße 315  
Only for VIK-design  
for frame size 315



Gehäusefuß der Baugröße -090L mit zusätzlichen Bohrungen auf BS entsprechend Baulänge -090S.  
Mounting foot of frame size -090L with extra holes at NDE corresponding to frame size -090S.



Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene

① Lage der Flanschbohrungen ab Flansch-  $\varnothing$  P=450  
② Lage der Flanschbohrungen bis einschl. Flansch-  $\varnothing$  P=400

Passung bis N=  $\varnothing$  250 ISO j6, ab N=  $\varnothing$  300 ISO h6  
Passfeder DIN 6885

Passung für Wellenende bis  $\varnothing$  28 ISO j6,  
ab  $\varnothing$  38 ISO k6, über  $\varnothing$  50 ISO m6

Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V1 in Schutzart  
erhöhte Sicherheit Exe oder auf besondere Bestellung  
Baugröße 90 ohne Tragöse  
Bauformen IM V1, IM V3, ab Baugröße 100: 2 Tragösen  
gegenüberliegend

**Flange-position:** The joining-side of the flange is position in a straight line with the shaft shoulder

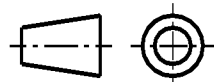
① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400  
Fit up to N =  $\varnothing$  250 ISO h6, from N =  $\varnothing$  300 ISO h6

Pin up 18 N 10 230 ISO j6, from N- Ø 300 ISO m6  
 Key to DIN 6885  
 Shaft end fit up to Ø 28 ISO j6,  
 up to Ø 38 ISO k6, from Ø 50 ISO m6  
 Terminal box can be turned 90° in each direction  
 Protection hood only with mounting IM V1 in increased  
 safety EExe or upon special request on order  
 Frame size 90 without eye bolt  
 Mountings IM V1, IM V3, from frame size 100: 2 eye bolt opposite

3) 2.Wellenende-2.Shaft-end:DA=24,DC=M8,EA=50,GC  
4) Typ / type: ANG. / ENG.  
5) Typ / type: AMG. / EMG.  
6) Abweichende Gewindegrößen nach Kunden-Auftrag  
oder thread sizes acc. customer order  
7) 315..-02: alternativ geschweißt  
alternatively welded

Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	AF	B	BA	BB	C	D	DB	E	EB	ED	CB	F	GA	H	HA	HD <sup>4)</sup>	HD <sup>5)</sup>	K	KA	L	LA	LC	LD	LF	M	N	P	S	T	X <sup>6)</sup>	Flansch wahlweise, flange optional					
		LA	M	N	P	S	T																																		
090L.	2-8	140	40	180	186	-	125	62	155	56	24	M8	50	40	5	0.4	8	27	90	13	252	266	10.5	12	324.5	10	380.5	168.5	361.5	165	130	200	11.5	3.5	1xM25x1.5	11	215	180	250	14	4
100L.	2-8	160	45	205	206	213	140	45	170	63	28 <sup>3)</sup>	M10 <sup>3)</sup>	60 <sup>3)</sup>	50 <sup>3)</sup>	5	0.6 <sup>3)</sup>	8	31 <sup>3)</sup>	100	15	271	285	12	18	382.5	11	443	193	423	215	180	250	14	4	1xM32x1.5	-	-	-	-	-	-
112M.	2-8	190	45	230	229	211	140	45	176	70	28	M10	60	50	5	0.6	8	31	112	16	303	303	12	18	389	10	453	200	435	215	180	250	14	4	2xM32x1.5	13	265	230	300	14	4
132S.	2-8	216	50	260	270	297	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	16	364	364	12	18	458	12	556	239	516	265	230	300	14	4	2xM32x1.5	11	215	180	250	14	4
132M.	2-8	216	50	260	270	297	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	16	364	364	12	18	496	12	594	258	554	265	230	300	14	4	2xM32x1.5	11	215	180	250	14	4
160M.	$\frac{2}{4-8}$	254	60	310	310	293	210	60	256	108	42	M16	110	100	5	1	12	45	160	20	418	418	15	22	$\frac{628}{580}$	13	756	323	$\frac{735}{619}$	300	250	350	18	5	2xM40x1.5	$\frac{11}{12}$	215	180	250	14	4
160L.	$\frac{2}{4-8}$	254	60	310	310	293	254	60	300	108	42	M16	110	100	5	1	12	45	160	20	418	418	15	22	$\frac{672}{624}$	13	800	345	$\frac{779}{663}$	300	250	350	18	5	2xM40x1.5	$\frac{11}{12}$	215	180	250	14	4
180M.	$\frac{2}{4-8}$	279	70	345	341	334	241	80	300	121	48	M16	110	100	5	0.6	14	51.5	180	25	477	477	15	25	$\frac{696}{646}$	13	832	351.5	$\frac{802.5}{690.5}$	300	250	350	18	5	2xM40x1.5	$\frac{12}{16}$	265	230	300	14	4
180L.	$\frac{2}{4-8}$	279	70	345	341	334	279	80	338	121	48	M16	110	100	5	0.6	14	51.5	180	25	477	477	15	25	$\frac{734}{684}$	13	870	370.5	$\frac{840.5}{728.5}$	300	250	350	18	5	2xM40x1.5	$\frac{12}{16}$	265	230	300	14	4
200L.	$\frac{2}{4-8}$	318	80	400	392	365	305	90	365	133	55	M20	110	100	5	1.6	16	59	200	30	525	525	20	26	766	15	916	395.5	840.5	350	300	400	18	5	2xM50x1.5	$\frac{15}{16}$	300	250	350	18	5
225S.	$\frac{2}{4-8}$	356	90	450	431	417	286	100	370	149	$\frac{55}{60}$	M20	$\frac{110}{140}$	$\frac{100}{125}$	$\frac{5}{7.5}$	1.6	$\frac{16}{18}$	$\frac{59}{64}$	225	32	578	578	20	26	$\frac{788}{818}$	16	$\frac{938}{998}$	$\frac{402}{432}$	$\frac{872}{902}$	400	350	450	18	5	2xM50x1.5	15	350	300	400	18	5
225M.	$\frac{2}{4-8}$	356	90	450	431	417	311	100	395	149	$\frac{55}{60}$	M20	$\frac{110}{140}$	$\frac{100}{125}$	$\frac{5}{7.5}$	1.6	$\frac{16}{18}$	$\frac{59}{64}$	225	32	578	578	20	26	$\frac{813}{843}$	16	$\frac{963}{1023}$	$\frac{414.5}{444.5}$	$\frac{896.5}{926.5}$	400	350	450	18	5	2xM50x1.5	15	350	300	400	18	5
250M.	$\frac{2}{4-8}$	406	100	505	489	487	349	100	420	168	$\frac{60}{65}$	M20	140	125	7.5	1.6	18	$\frac{64}{69}$	250	35	654	654	25	36	937	18	1110	482.5	1037.5	500	450	550	18	5	2xM63x1.5						
280S.	$\frac{2}{4-8}$	457	110	570	550	609	368	120	470	190	$\frac{65}{75}$	M20	140	125	7.5	1.6	$\frac{18}{20}$	$\frac{69}{79.5}$	280	40	729	729	26	38	1004	18	1184	514	1116	500	450	550	18	5	2xM63x1.5	18	400	350	450	18	5
280M.	$\frac{2}{4-8}$	457	110	570	550	609	419	120	520	190	$\frac{65}{75}$	M20	140	125	7.5	1.6	$\frac{18}{20}$	$\frac{69}{79.5}$	280	40	729	729	26	38	1055	18	1235	539.5	1166.5	500	450	550	18	5	2xM63x1.5	18	400	350	450	18	5
315S.	$\frac{2}{4-8}$	508	120	630	622	644	406	130	520	216	$\frac{65}{80}$	M20	$\frac{140}{170}$	$\frac{125}{140}$	$\frac{7.5}{15}$	1.6	$\frac{18}{22}$	$\frac{69}{85}$	315	45	809	935	30	40	$\frac{1110}{1200}$	22	$\frac{1347}{1420}$	$\frac{559}{589}$	$\frac{1273}{1310}$	600	550	660	23	6	2xM63x1.5						
315M.	$\frac{2}{4-8}$	508	120	630	622	644	457	130	570	216	$\frac{65}{80}$	M20	$\frac{140}{170}$	$\frac{125}{140}$	$\frac{7.5}{15}$	1.6	$\frac{18}{22}$	$\frac{69}{85}$	315	45	809	935	30	40	$\frac{1161}{1251}$	22	$\frac{1398}{1471}$	$\frac{584.5}{614.5}$	$\frac{1324}{1361.5}$	600	550	660	23	6	2xM63x1.5						

# FLENDER LOHER



Erstellt  
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Letzte Änderung  
Last change

Drehstrommotor mit Käfigläufer  
Three-phase-motor with squirrel cage-rotor  
Typ/type: A.G./E.G. 7) A.S./E.S.  
Bauform/mounting: IM B35, IM V15, IM V36  
DIN 42673 u. DIN 42677

Zeichnung-Nr.  
Drawing No.

MLA00-0025

Blatt  
Sheet

*Sprache*  
*Language*

Diese technische Unterlage hat  
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Bearbeitet, Designed
Geprüft, Checked

16.07.02	Schiestl K.	12.11.03	IMT26KA
16.07.02	IMT2 HK	12.11.03	IMT...

*This technical document  
is proprietary (DIN34).*

Teileklasse	20501
Classification	

Bezeichnung	Maßblatt
Drawing title	Dimension sheet

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Plotdatum  
Print date

Plottersteller  
Printed by

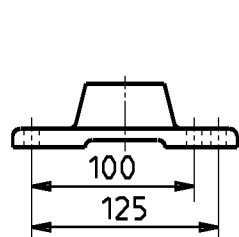
für Abteilung  
for Department

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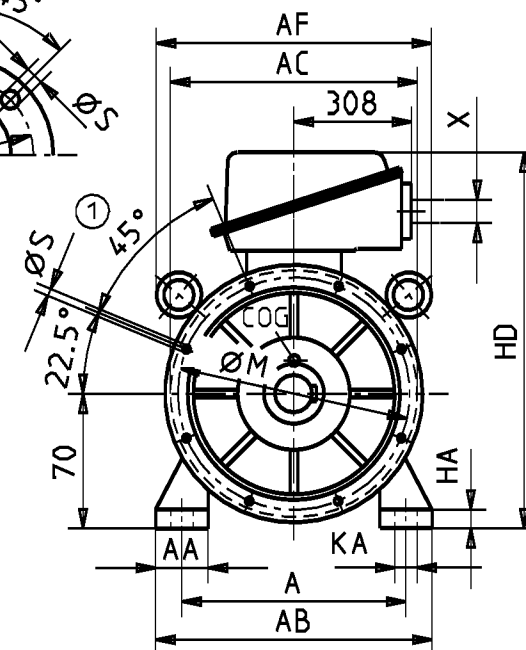
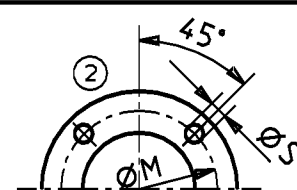
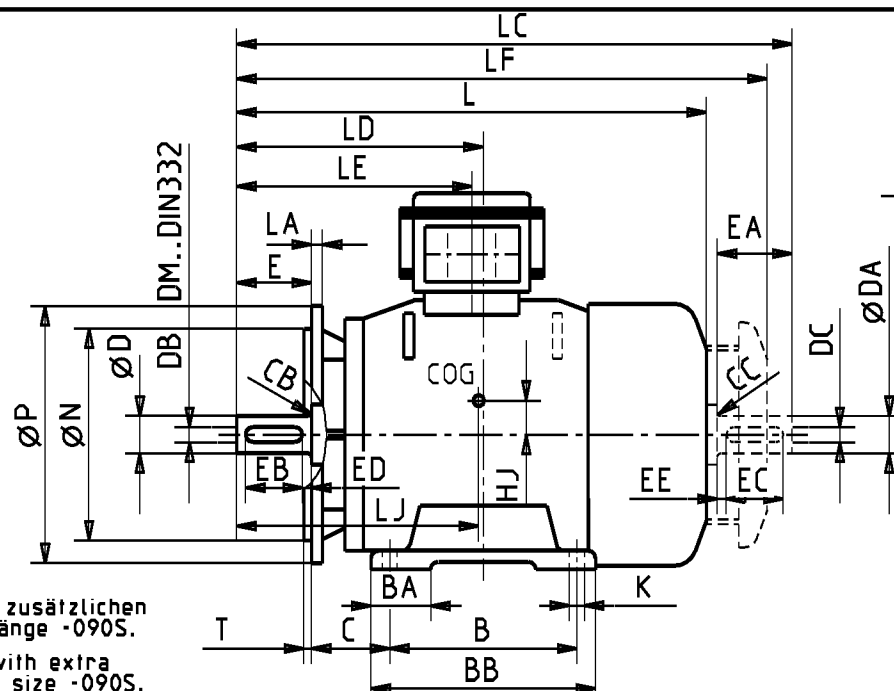
Letzter Änd.-Index	
Last change index	

Format DIN
Size DIN A

Nur für VIK-Ausführung  
bei Baugröße 315  
Only for VIK-design  
for frame size 315



Gehäusefuß der Baugröße -090L. mit zusätzlichen Bohrungen auf BS entsprechend Baulänge -090S.  
Mounting foot of frame size -090L. with extra holes at NDE corresponding to frame size -090S.



**Flanschlage:** Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene

- ① Lage der Flanschbohrungen ab Flansch-  $\varnothing$  P-450
- ② Lage der Flanschbohrungen bis einschl. Flansch-  $\varnothing$  P-400

Passung bis N-  $\varnothing$  250 ISO j6, ab N-  $\varnothing$  300 ISO h6  
Passfeder DIN 6885  
Passung für Wellenende bis  $\varnothing$  28 ISO j6,  
ab  $\varnothing$  38 ISO k6, über  $\varnothing$  50 ISO m6  
Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V1 in Schutzart  
erhöhte Sicherheit Exe oder auf besondere Bestellung  
Baugröße 90 ohne Tragöse  
Bauformen IM V1, IM V3, ab Baugröße 100: 2 Tragösen  
gegenüberliegend

**Flange-position:** The joining-side of the flange is position in a straight line with the shaft shoulder

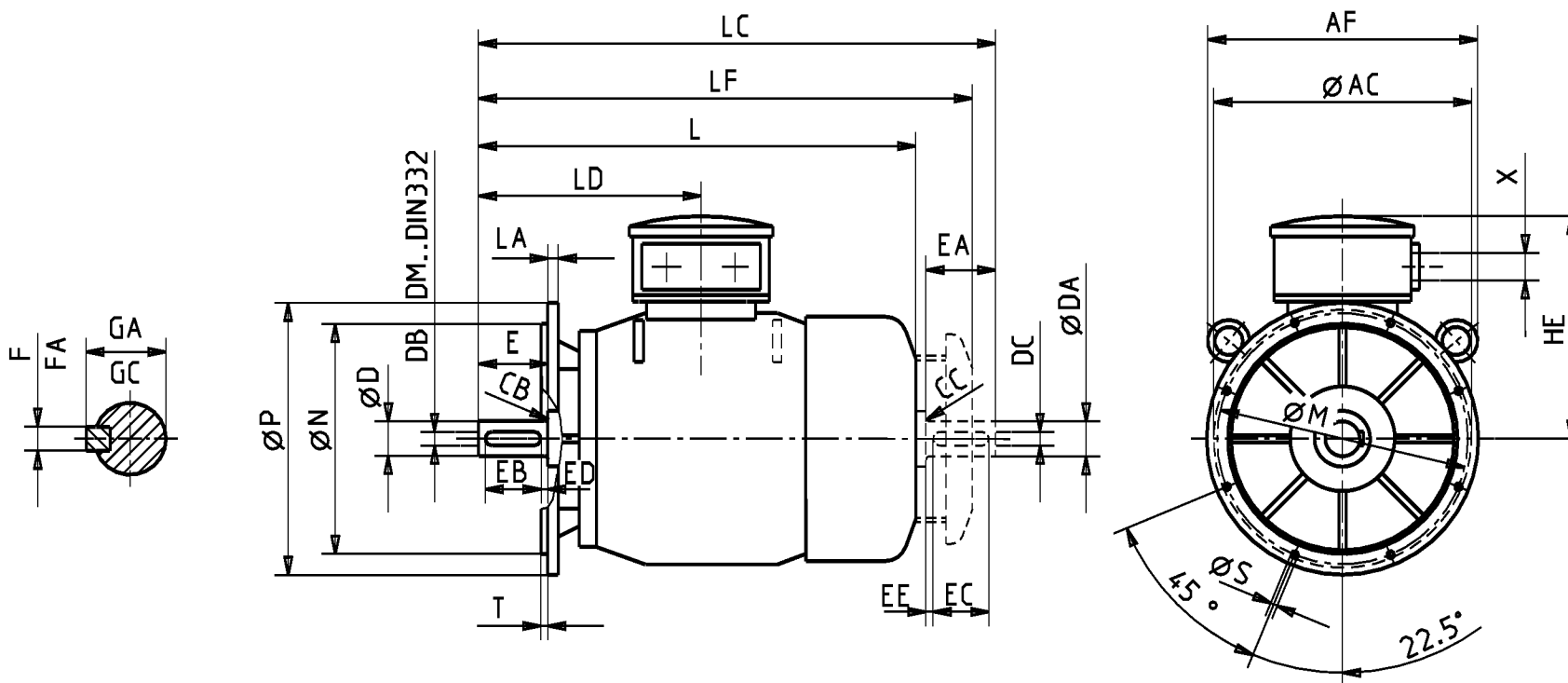
① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400  
Fit up to N=  $\varnothing 250$  ISO i6, from N=  $\varnothing 300$  ISO h6

Fit up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
Key to DIN 6885  
Shaft end fit up to Ø 28 ISO j6,  
up to Ø 38 ISO k6, from Ø 50 ISO m6  
Terminal box can be turned 90° in each direction  
Protection hood only with mounting IM V1 in increased  
safety EExe or upon special request on order  
Frame size 90 without eye bolt  
Mountings IM V1, IM V3 from frame size 100: 2 eye bolt opposite

4) Typ / type: ANG./ ENG.  
5) Typ / type: AMG./ EMG.  
6) Abweichende Gewindegrößen nach Kunden-Auftrag  
other thread sizes acc. customer order  
7) 315..-02: alternativ geschweißt  
alternatively welded

[illegible][illegible]





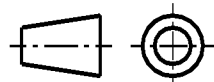
Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
 Passung bis N=  $\varnothing$  250 ISO j6  
 Passfeder DIN 6885  
 Passung für Wellenende bis  $\varnothing$  28 ISO j6, ab  $\varnothing$  38 ISO k6  
 Klemmenkasten um je 90° drehbar  
 Schutzdeckel nur bei Bauform IM V18 in Schutzart erhöhte Sicherheit EExe oder auf besondere Bestellung  
 Baugröße 90 ohne Tragöse

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
 Fit up to N=  $\varnothing$  250 ISO j6  
 Key to DIN 6885  
 Shaft end fit up to  $\varnothing$  28 ISO j6, up to  $\varnothing$  38 ISO k6  
 Terminal box can be turned 90° in each direction  
 Protection hood only with mounting IM V18 in increased safety EExe or upon special request on order  
 Frame size 90 without eye bolt

- 1) 2. Wellenende/2. Shaft-end: DA=24, DC=M8, EA=50, GC=27, EC=40, CC=0.4
- 2) Typ / type: ANG./ ENG.
- 3) Typ / type: AMG./ EMG.
- 4) Abweichende Gewindegrößen nach Kunden-Auftrag  
 other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	AC	AF	D DA	DB DC	E EA	EB EC	ED EE	CB CC	F FA	GA GC	HE <sup>2)</sup>	HE <sup>3)</sup>	L	LA	LC	LD	LF	M	N	P	S	T	X <sup>4)</sup>	Flansch wahlweise, flange optional					
																									LA	M	N	P	S	T
090L.	2-8	186	-	24	M8	50	40	5	0.4	8	27	162	176	324.5	10	380.5	168.5	361.5	115	95	140	M8	3	1xM25x1.5	8 10	100 130	80 110	120 160	M6 M8	3 3.5
100L.	2-8	206	213	28 <sup>1)</sup>	M10 <sup>1)</sup>	60 <sup>1)</sup>	50 <sup>1)</sup>	5	0.6 <sup>1)</sup>	8	31 <sup>1)</sup>	171	185	382.5	10	443	193	423	130	110	160	M8	3.5	1xM32x1.5	10 12	115 165	95 130	140 200	M8 M10	3 3.5
112M.	2-8	229	211	28	M10	60	50	5	0.6	8	31	191	191	389	10	453	200	435	130	110	160	M8	3.5	2xM32x1.5	12	165	130	200	M10	3.5
132S.	2-8	270	297	38	M12	80	70	5	0.6	10	41	232	232	458	11	556	239	516	215	180	250	M12	4	2xM32x1.5	12	265	230	300	M12	4
132M.	2-8	270	297	38	M12	80	70	5	0.6	10	41	232	232	496	11	594	258	554	215	180	250	M12	4	2xM32x1.5	12	265	230	300	M12	4
160M.	2 4-8	310	293	42	M16	110	100	5	1	12	45	258	258	628 580	12	756	323	735 619	265	230	300	M12	4	2xM40x1.5	11 13	215 300	180 250	250 350	M12 M16	4 5
160L.	2 4-8	310	293	42	M16	110	100	5	1	12	45	258	258	672 624	12	800	345	779 663	265	230	300	M12	4	2xM40x1.5	11 13	215 300	180 250	250 350	M12 M16	4 5
180M.	2 4-8	341	334	48	M16	110	100	5	0.6	14	51.5	297	297	696 646	13	832	351.5	802.5 690.5	300	250	350	M16	5	2xM40x1.5	12	265	230	300	M12	4
180L.	2 4-8	341	334	48	M16	110	100	5	0.6	14	51.5	297	297	734 684	13	870	370.5	840.5 728.5	300	250	350	M16	5	2xM40x1.5	12	265	230	300	M12	4

**FLENDER  
LOHER**



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Letzte Änderung  
Last change

Drehstrommotor mit Käfigläufer  
 Three-phase-motors with squirrel cage-rotor  
 Typ/type: A.G./E.G.  
 Bauform/mounting: IM B14, IM V18, IM V19 DIN 42677

Zeichnung-Nr.  
Drawing No.

**MLA00-0026**

Blatt  
Sheet

Sprache  
Language

de/en

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Bearbeitet, Designed  
 Geprüft, Checked  
 Teileklasse  
 Classification **20501**

Bezeichnung  
 Drawing title **Maßblatt  
 Dimension sheet**

Plotdatum  
Print date

Plottersteller  
Printed by

für Abteilung  
for Department

Plotstatus  
Print status

Letzter Änd.-Index  
Last change index

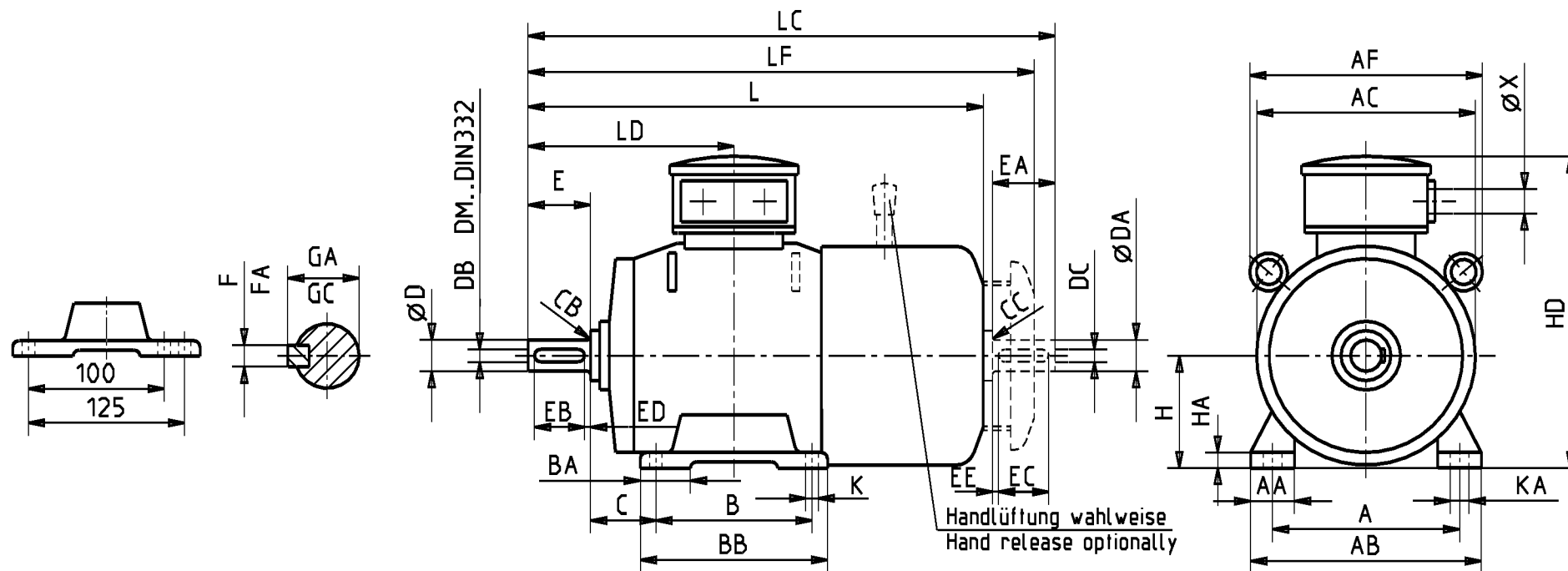
**c**

Format DIN A  
 Size DIN A

**3**







Gehäusefuß der Baugröße -090L mit zusätzlichen Bohrungen auf BS entsprechend Baulänge -090S.  
Mounting foot of frame size -090L with extra holes at NDE corresponding to frame size -090S.

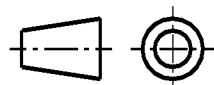
Paßfeder DIN 6885  
Passung für Wellenende bis  $\varnothing 28$  ISO j6,  
ab  $\varnothing 38$  ISO k6, über  $\varnothing 50$  ISO m6  
Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V5 in Schutzart  
erhöhte Sicherheit EExe oder auf besondere Bestellung  
Baugröße 90 ohne Tragöse

Key to DIN 6885  
Shaft end fit up to  $\varnothing 28$  ISO j6,  
up to  $\varnothing 38$  ISO k6, from  $\varnothing 50$  ISO m6  
Terminal box can be turned 90° in each direction  
Protection hood only with mounting IM V5 in increased  
safety EExe or upon special request on order  
Frame size 90 without eye bolt

1) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	AF	B	BA	BB	C	H	HA	HD	K	KA	L	LC	LD	LF	X <sup>1)</sup>	1.Wellenende/1st shaft end								2.Wellenende/2nd shaft end								Bremse/brake	
																					D	DB	E	EB	ED	CB	F	GA	DA	DC	EA	EC	EE	CC	FA	GC	Nm	Größe/size
090L.	2-8	140	40	180	186	-	125	62	155	56	90	13	252	10.5	12	389	435	168.5	426	1xM25x1.5	24	M8	50	40	5	0.4	8	27	19	M6	40	32	4	0.4	6	21.5	16 32	10 12
100L.	2-8	160	45	205	206	213	140	45	170	63	100	15	271	12	18	455	514	193	495	1xM32x1.5	28	M10	60	50	5	0.6	8	31	24	M8	50	40	5	0.4	8	27	32	12
112M.	2-8	190	45	230	229	211	140	45	176	70	112	16	303	12	18	467	527	200	513	2xM32x1.5	28	M10	60	50	5	0.6	8	31	24	M8	50	40	5	0.4	8	27	32 60	12 14
132S.	2-8	216	50	260	270	297	140	50	185	89	132	16	364	12	18	568	646	239	626	2xM32x1.5	38	M12	80	70	5	0.6	10	41	28	M10	60	50	5	0.4	8	31	60 80 150	14 16 18
132M.	2-8	216	50	260	270	297	178	50	223	89	132	16	364	12	18	606	684	258	664	2xM32x1.5	38	M12	80	70	5	0.6	10	41	28	M10	60	50	5	0.4	8	31	60 80 150	14 16 18
160M.	2-8	254	60	310	310	293	210	60	256	108	160	20	418	15	22	719	847	323	779	2xM40x1.5	42	M16	110	100	5	1	12	45	42	M16	110	100	5	1	12	45	150 260	18 20
160L.	2-8	254	60	310	310	293	254	60	300	108	160	20	418	15	22	763	891	345	823	2xM40x1.5	42	M16	110	100	5	1	12	45	42	M16	110	100	5	1	12	45	150 260	18 20
180M.	2-8	279	70	345	341	334	241	80	300	121	180	25	477	15	25	774	909	351.5	819	2xM40x1.5	48	M16	110	100	5	0.6	14	51.5	42	M16	110	100	5	1	12	45	150 260	18 20
180L.	2-8	279	70	345	341	334	279	80	338	121	180	25	477	15	25	812	947	370.5	857	2xM40x1.5	48	M16	110	100	5	0.6	14	51.5	42	M16	110	100	5	1	12	45	150 260	18 20
200L.	2-8	318	80	400	392	365	305	90	365	133	200	30	525	20	26	882	1026	395.5	944	2xM50x1.5	55	M20	110	100	5	1.6	16	59	42	M16	110	100	5	1	12	45	260 400	20 25
225S.	2 4-8	356	90	450	431	417	286	100	370	149	225	32	578	20	26	899 929	1079 1109	402 432	983 1013	2xM50x1.5	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	60	M20	140	125	7.5	1.6	18	64	400	25
225M.	2 4-8	356	90	450	431	417	311	100	395	149	225	32	578	20	26	924 954	1104 1134	414.5 444.5	1008 1038	2xM50x1.5	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	60	M20	140	125	7.5	1.6	18	64	400	25
250M.	2 4-8	406	100	505	489	487	349	100	420	168	250	35	654	25	36	1073	1246	482.5	1173	2xM63x1.5	60 65	M20	140	125	7.5	1.6	18	64 69	60	M20	140	125	7.5	1.6	18	69	400	25

FLENDER  
LOHER



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Compiled

Letzte Änderung  
Last change

Datum Date	Name Name	Datum Date	Name Name
15.07.02	Schiestl K.	03.12.03	IMT26KA
15.07.02	IMT2HK	03.12.03	IMT

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: ABGA  
Bauform/mounting: IM B3, IM V5, IM V6 DIN 42673

Zeichnung-Nr.  
Drawing No.

MLA00-0028

Blatt  
Sheet

Sprache  
Language

de/en

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Teileklasse  
Classification 20501

Bezeichnung  
Drawing title Maßblatt  
Dimension sheet

Plotdatum  
Print date

Plottersteller  
Printed by

für Abteilung  
for Department

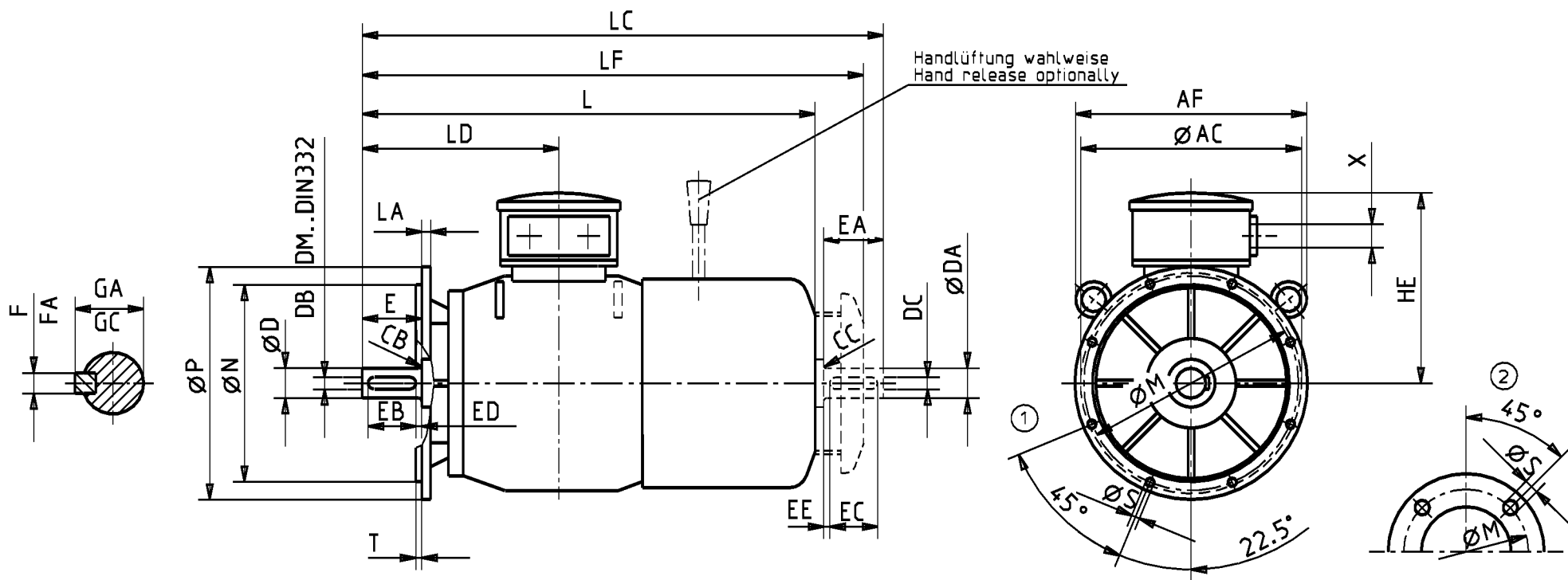
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Letzter Änd.-Index  
Last change index

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Format DIN A  
Size DIN A

3



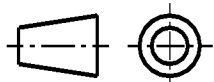
Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
① Lage der Flanschbohrungen ab Flansch- Ø P=450  
② Lage der Flanschbohrungen bis einschl. Flansch- Ø P=400  
Passung bis N= Ø 250 ISO j6, ab N= Ø 300 ISO h6  
Passfeder DIN 6885  
Passung für Wellenende bis Ø 28 ISO j6, ab Ø 38 ISO k6, über Ø 50 ISO m6  
Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V1 in Schutzart erhöhte Sicherheit EExe oder auf besondere Bestellung  
Baugröße 90 ohne Tragöse  
Bauformen IM V1, IM V3, ab Baugröße 100: 2 Tragösen gegenüberliegend

Flange-position: The joining-side of the flange is position in a stright line with the shaft shoulder  
① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400  
Fit up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
Key to DIN 6885  
Shaft end fit up to Ø 28 ISO j6, up to Ø 38 ISO k6, from Ø 50 ISO m6  
Terminal box can be turned 90° in each direction  
Protection hood only with mounting IM V1 in increased safety EExe or upon special request on order  
Frame size 90 without eye bolt  
Mountings IM V1,IM V3,from frame size 100: 2 eye bolt opposite

3) Abweichende Gewindegrößen nach Kunden-Auftrag  
other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	AC	AF	HE	L	LA	LC	LD	LF	M	N	P	S	T	X <sup>31</sup>	Flansch wahlweise/flange optionally						1.Wellenende/1st shaft end										2.Wellenende/2nd shaft end										Bremsen/brake	
																LA	M	N	P	S	T	D	DB	E	EB	ED	CB	F	GA	DA	DC	EA	EC	EE	CC	FA	GC	Nm	Größe/size				
090L.	2-8	186	-	162	389	10	435	168.5	426	165	130	200	11.5	3.5	1xM25x1.5	11	215	180	250	14	4	24	M8	50	40	5	0.4	8	27	19	M6	40	32	4	0.4	6	21.5	16 32	10 12				
100L.	2-8	206	213	171	455	11	514	193	495	215	180	250	14	4	1xM32x1.5	-	-	-	-	-	-	28	M10	60	50	5	0.6	8	31	24	M8	50	40	5	0.4	8	27	32	12				
112M.	2-8	229	211	191	467	10	527	200	513	215	180	250	14	4	2xM32x1.5	13	265	230	300	14	4	28	M10	60	50	5	0.6	8	31	24	M8	50	40	5	0.4	8	27	32 60	12 14				
132S.	2-8	270	297	232	568	12	646	239	626	265	230	300	14	4	2xM32x1.5	11	215	180	250	14	4	38	M12	80	70	5	0.6	10	41	28	M10	60	50	5	0.4	8	31	60 80 150	14 16 18				
132M.	2-8	270	297	232	606	12	684	258	664	265	230	300	14	4	2xM32x1.5	11	215	180	250	14	4	38	M12	80	70	5	0.6	10	41	28	M10	60	50	5	0.4	8	31	60 80 150	14 16 18				
160M.	2-8	310	293	258	719	13	847	323	779	300	250	350	18	5	2xM40x1.5	11 12	215 265	180 230	250 300	14 14	4 4	42	M16	110	100	5	1	12	45	42	M16	110	100	5	1	12	45	150 260	18 20				
160L.	2-8	310	293	258	763	13	891	345	823	300	250	350	18	5	2xM40x1.5	11 12	215 265	180 230	250 300	14 14	4 4	42	M16	110	100	5	1	12	45	42	M16	110	100	5	1	12	45	150 260	18 20				
180M.	2-8	341	334	297	774	13	909	351.5	819	300	250	350	18	5	2xM40x1.5	12 16	265 400	230 350	300 450	14 18	4 5	48	M16	110	100	5	0.6	14	51.5	42	M16	110	100	5	1	12	45	150 260	18 20				
180L.	2-8	341	334	297	812	13	947	370.5	857	300	250	350	18	5	2xM40x1.5	12 16	265 400	230 350	300 450	14 18	4 5	48	M16	110	100	5	0.6	14	51.5	42	M16	110	100	5	1	12	45	150 260	18 20				
200L.	2-8	392	365	325	882	15	1026	395.5	944	350	300	400	18	5	2xM50x1.5	15 16	300 400	250 350	350 450	18 18	5 5	55	M20	110	100	5	1.6	16	59	42 55	M16 M20	110 110	100 100	5 5	1 0.6	12 16	45 59	260 400	20 25				
225S.	2 4-8	431	417	353	899 929	16	1079 1109	402 432	983 1013	400	350	450	18	5	2xM50x1.5	15	350	300	400	18	5	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	60	M20	140	125	7.5	1.6	18	64	400	25				
225M.	2 4-8	431	417	353	924 954	16	1104 1134	414.5 444.5	1008 1038	400	350	450	18	5	2xM50x1.5	15	350	300	400	18	5	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	60	M20	140	125	7.5	1.6	18	64	400	25				
250M.	2	489	487	400	1073	18	1246	482.5	1173	500	450	550	18	5	2xM63x1.5	--	--	--	--	--	--	60 65	M20	140	125	7.5	1.6	18	64 69	60	M20	140	125	7.5	1.6	18	69	400	25				

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Letzte Änderung  
Last change

Drehstrommotor mit Käfigläufer  
Three-phase-motors with squirrel cage-rotor  
Typ/type: ABGA  
Bauform/mounting: IM B5, IM V1, IM V3 DIN 42677

Zeichnung-Nr.  
Drawing No.

MLA00-0029

Blatt  
Sheet

Sprache  
Language

de/en

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Classification 20501

Datum  
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Name  
Name Schiestl K.  
Datum  
Date 03.12.03  
Name  
Name IMT26KA  
Bezeichnung  
Drawing title Maßblatt  
Dimension sheet

Plotdatum  
Print date

Plotersteller  
Printed by

für Abteilung  
for Department

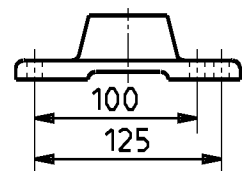
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Letzter Änd.-Index  
Last change index

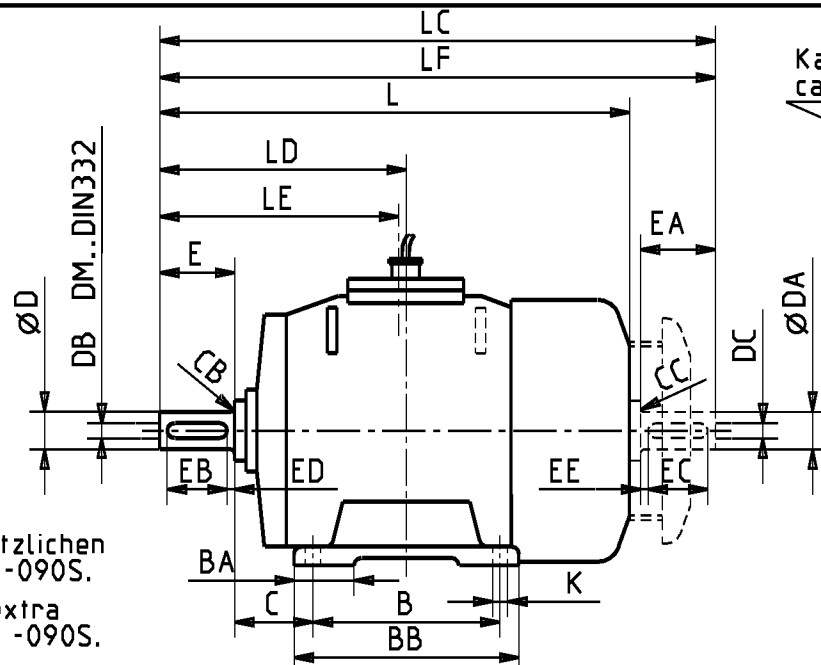
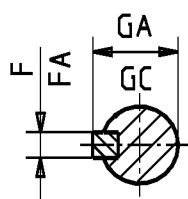
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Format DIN A  
Size DIN A

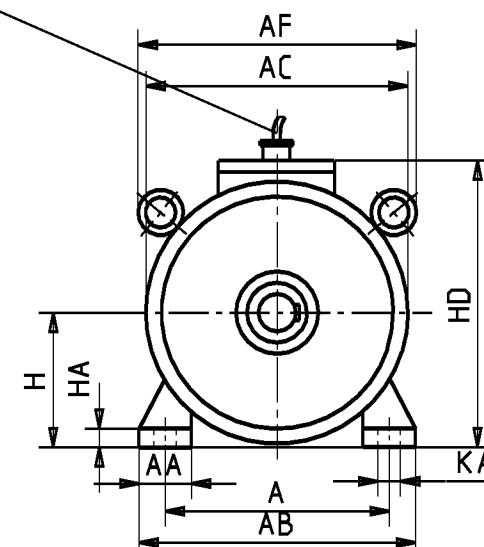
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Gehäusefuß der Baugröße -090L mit zusätzlichen Bohrungen auf BS entsprechend Baulänge -090S.  
Mounting foot of frame size -090L with extra holes at NDE corresponding to frame size -090S.



Kabellänge nach Kundenforderung  
cable length due to customer spec.



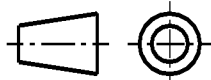
Passfeder DIN 6885  
Passung für Wellenende bis  $\varnothing 28$  ISO j6,  
ab  $\varnothing 38$  ISO k6, über  $\varnothing 50$  ISO m6  
Schutzdeckel nur bei Bauform IM V5 in Schutzart  
erhöhte Sicherheit EExe oder auf besondere Bestellung  
Baugröße 90 ohne Tragöse

Key to DIN 6885  
Shaft end fit up to  $\varnothing 28$  ISO j6,  
up to  $\varnothing 38$  ISO k6, from  $\varnothing 50$  ISO m6  
Protection hood only with mounting IM V5 in increased  
safety EExe or upon special request on order  
Frame size 90 without eye bolt

1) 2-Wellenende/2-Shaft-end: DA=24, DC=M8, EA=50, GC=27, EC=40, CC=0.4  
2) 315...-02: alternativ geschweißt  
alternatively welded

Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	AF	B	BA	BB	C	D DA	DB DC	E EA	EB EC	ED EE	CB CC	F FA	GA GC	H	HA	HD	K	KA	L	LC	LD	LF	LE
090L	2-8	140	40	180	186	-	125	62	155	56	24	M8	50	40	5	0.4	8	27	90	13	184	10.5	12	324.5	380.5	168.5	361.5	168.5
100L	2-8	160	45	205	206	213	140	45	170	63	28 <sup>1)</sup>	M10 <sup>1)</sup>	60 <sup>1)</sup>	50 <sup>1)</sup>	5	0.6 <sup>1)</sup>	8	31 <sup>1)</sup>	100	15	203	12	18	382.5	443	193	423	193
112M	2-8	190	45	230	229	211	140	45	176	70	28	M10	60	50	5	0.6	8	31	112	16	231	12	18	389	453	200	435	200
132S	2-8	216	50	260	270	297	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	16	274	12	18	458	556	239	516	239
132M	2-8	216	50	260	270	297	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	16	274	12	18	496	594	258	554	258
160M	2 4-8	254	60	310	310	293	210	60	256	108	42	M16	110	100	5	1	12	45	160	20	328	15	22	628 580	756	323	735 619	323
160L	2 4-8	254	60	310	310	293	254	60	300	108	42	M16	110	100	5	1	12	45	160	20	328	15	22	672 624	800	345	779 663	345
180M	2 4-8	279	70	345	341	334	241	80	300	121	48	M16	110	100	5	0.6	14	51.5	180	25	364	15	25	696 646	832	351.5	802.5 690.5	351.5
180L	2 4-8	279	70	345	341	334	279	80	338	121	48	M16	110	100	5	0.6	14	51.5	180	25	364	15	25	734 684	870	370.5	840.5 728.5	370.5
200L	2 4-8	318	80	400	392	365	305	90	365	133	55	M20	110	100	5	1.6	16	59	200	30	412	20	26	766	916	395.5	840.5	395.5
225S	2 4-8	356	90	450	431	417	286	100	370	149	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	225	32	465	20	26	788 818	938 998	402 432	872 902	402 432
225M	2 4-8	356	90	450	431	417	311	100	395	149	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	225	32	465	20	26	813 843	963 1023	414.5 444.5	896.5 926.5	414.5 444.5
250M	2 4-8	406	100	505	489	487	349	100	420	168	60 65	M20	140	125	7.5	1.6	18	64 69	250	35	529	25	36	937	1110	482.5	1037.5	482.5
280S	2 4-8	457	110	570	550	609	368	120	470	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	593	26	38	1004	1184	514	1116	514
280M	2 4-8	457	110	570	550	609	419	120	520	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	593	26	38	1055	1235	539.5	1166.5	539.5
315S	2 4-8	508	120	630	622	644	406	130	520	216	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	673	30	40	1110 1200	1347 1420	559 589	1273 1310	559 589
315M	2 4-8	508	120	630	622	644	457	130	570	216	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	673	30	40	1161 1251	1398 1471	584.5 614.5	1324 1361.5	584.5 614.5
315L	2 4-8	508	120	630	622	644	508	130	621	216	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	673	30	40	1281 1371	1524 1591	610 640	584.5 614.5	584.5 614.5

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Letzte Änderung  
Last change

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: A.G./E.G. 2) A.S./E.S.  
Bauform/mounting: IM B3, IM V5, IM V6 DIN 42673

Zeichnung-Nr.  
Drawing No.

MLA00-0031

Blatt  
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Sprache  
Language

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18.09.02 IMT27SU 04.12.03 IMT26KA  
18.09.02 IMT2HK 04.12.03 IMT

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Teileklasse 20501  
Classification

Bezeichnung Maßblatt  
Drawing title Dimension sheet

Plotdatum  
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Plottersteller  
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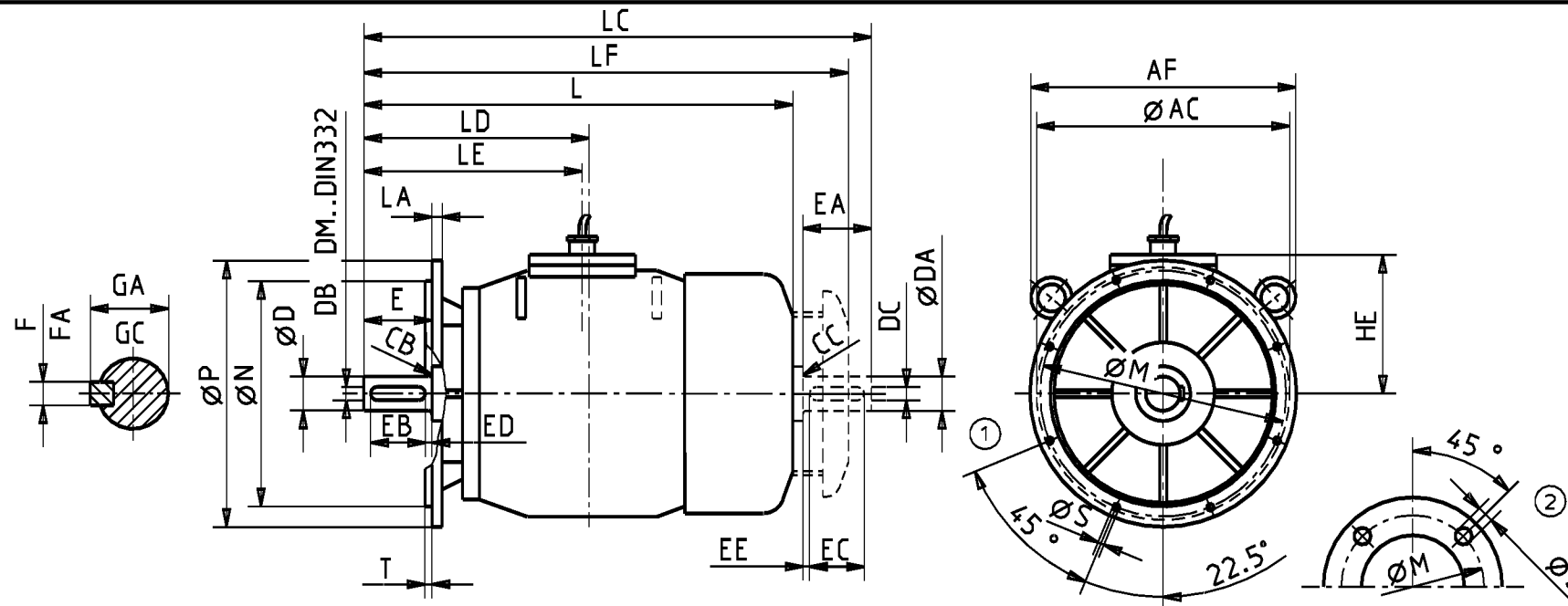
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Letzter Änd.-Index  
Last change index

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Size DIN A

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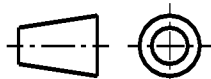
Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
① Lage der Flanschbohrungen ab Flansch-Ø P=450  
② Lage der Flanschbohrungen bis einschl. Flansch-Ø P=400  
Passung bis N= Ø 250 ISO j6, ab N= Ø 300 ISO h6  
Passfeder DIN 6885  
Passung für Wellenende bis Ø 28 ISO j6, ab Ø 38 ISO k6, über Ø 50 ISO m6  
Schutzdeckel nur bei Bauform IM V1 in Schutzart erhöhte Sicherheit EXe oder auf besondere Bestellung  
Baugröße 90 ohne Tragöse  
Bauformen IM V1, IM V3, ab Baugröße 100: 2 Tragösen gegenüberliegend

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400  
Fit up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
Key to DIN 6885  
Shaft end fit up to Ø 28 ISO j6, up to Ø 38 ISO k6, from Ø 50 ISO m6  
Protection hood only with mounting IM V1 in increased safety EXe or upon special request on order  
Frame size 90 without eye bolt  
Mountings IM V1, IM V3, from frame size 100: 2 eye bolt opposite

3) 2 Wellenende, 2 Shaft-end: DA=24, DC=M8, EA=50, GC=27, EC=40, CC=0.4  
4) Typ: type: ANG./ENG.  
5) Typ: type: AMG./EMG.

Baugröße frame size	Polzahl number of poles	AC	AF	D DA	DB DC	E EA	EB EC	EB EC	EB EC	F FA	GA GC	HE	L	LA	LC	LD	LE	LF	M	N	P	S	T	Flansch wahlweise, flange optional					
																								LA	M	N	P	S	T
090L.	2-8	186	-	24	M8	50	40	5	0.4	8	27	94	324.5	10	380.5	168.5	168.5	361.5	165	130	200	11.5	3.5	11	215	180	250	14	4
100L.	2-8	206	213	28 <sup>3)</sup>	M10 <sup>3)</sup>	60 <sup>3)</sup>	50 <sup>3)</sup>	5	0.6 <sup>3)</sup>	8	31 <sup>3)</sup>	103	382.5	11	443	193	193	423	215	180	250	14	4	-	-	-	-	-	-
112M.	2-8	229	211	28	M10	60	50	5	0.6	8	31	119	389	10	453	200	200	435	215	180	250	14	4	13	265	230	300	14	4
132S.	2-8	270	297	38	M12	80	70	5	0.6	10	41	142	458	12	556	239	239	516	265	230	300	14	4	11	215	180	250	14	4
132M.	2-8	270	297	38	M12	80	70	5	0.6	10	41	142	496	12	594	258	258	554	265	230	300	14	4	11	215	180	250	14	4
160M.	2	310	293	42	M16	110	100	5	1	12	45	168	628	13	756	323	323	735	300	250	350	18	5	11	215	180	250	14	4
	4-8												580					619						12	265	230	300	14	4
160L.	2	310	293	42	M16	110	100	5	1	12	45	168	672	13	800	345	345	779	300	250	350	18	5	11	215	180	250	14	4
	4-8												624					663						12	265	230	300	14	4
180M.	2	341	334	48	M16	110	100	5	0.6	14	51.5	184	696	13	832	351.5	351.5	802.5	300	250	350	18	5	12	265	230	300	14	4
	4-8												646					690.5						16	400	350	450	18	5
180L.	2	341	334	48	M16	110	100	5	0.6	14	51.5	184	734	13	870	370.5	370.5	840.5	300	250	350	18	5	12	265	230	300	14	4
	4-8												684					728.5						16	400	350	450	18	5
200L.	2	392	365	55	M20	110	100	5	1.6	16	59	212	766	15	916	395.5	395.5	840.5	350	300	400	18	5	15	300	250	350	18	5
	4-8												766					840.5						16	400	350	450	18	5
225S.	2	431	417	55	M20	110	100	5	1.6	16	59	240	788	16	938	402	402	872	400	350	450	18	5	15	350	300	400	18	5
	4-8			60		140	125	7.5		18	64		818					902						15	350	300	400	18	5
225M.	2	431	417	55	M20	110	100	5	1.6	16	59	240	813	16	963	414.5	414.5	896.5	400	350	450	18	5	15	350	300	400	18	5
	4-8			60		140	125	7.5		18	64		843					926.5						15	350	300	400	18	5
250M.	2	489	487	60	M20	140	125	7.5	1.6	18	64	279	937	18	1110	482.5	482.5	1037.5	500	450	550	18	5	-	-	-	-	-	-
	4-8			65		140	125	7.5		18	69		937					1037.5						-	-	-	-	-	-
280S.	2	550	609	65	M20	140	125	7.5	1.6	18	69	313	1004	18	1184	514	514	1116	500	450	550	18	5	-	-	-	-	-	-
	4-8			75		140	125	7.5		20	79.5		1004					1116						-	-	-	-	-	-
280M.	2	550	609	65	M20	140	125	7.5	1.6	18	69	313	1055	18	1235	539.5	539.5	1166.5	500	450	550	18	5	-	-	-	-	-	-
	4-8			75		140	125	7.5		20	79.5		1055					1166.5						-	-	-	-	-	-
315S.	2	622	644	65	M20	140	125	7.5	1.6	18	69	358	1110	22	1347	559	559	1314	600	550	660	23	6	-	-	-	-	-	-
	4-8			80		170	140	15		22	85		1200					1310						-	-	-	-	-	-
315M.	2	622	644	65	M20	140	125	7.5	1.6	18	69	358	1161	22	1398	584.5	584.5	1364.5	600	550	660	23	6	-	-	-	-	-	-
	4-8			80		170	140	15		22	85		1251					1361.5						-	-	-	-	-	-
315L.	2	622	644	65	M20	140	125	7.5	1.6	18	69	358	1281	22	1524	610	584.5	1444	600	550	660	23	6	-	-	-	-	-	-
	4-8			80		170	140	15		22	85		1371					1534						-	-	-	-	-	-

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Compiled

Letzte Änderung  
Last change

Drehstrommotor mit Käfigläufer  
Three-phase-motors with squirrel cage-rotor  
Typ/type: ANG./ENG.  
Bauform/mounting: IM B5, IM V1, IM V3 DIN 42677

Zeichnung-Nr.  
Drawing No.

MLA00-0032

Blatt  
Sheet

Sprache  
Language

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Classification 20501

Bezeichnung  
Drawing title Maßblatt  
Dimension sheet

Plotdatum  
Print date

Plottersteller  
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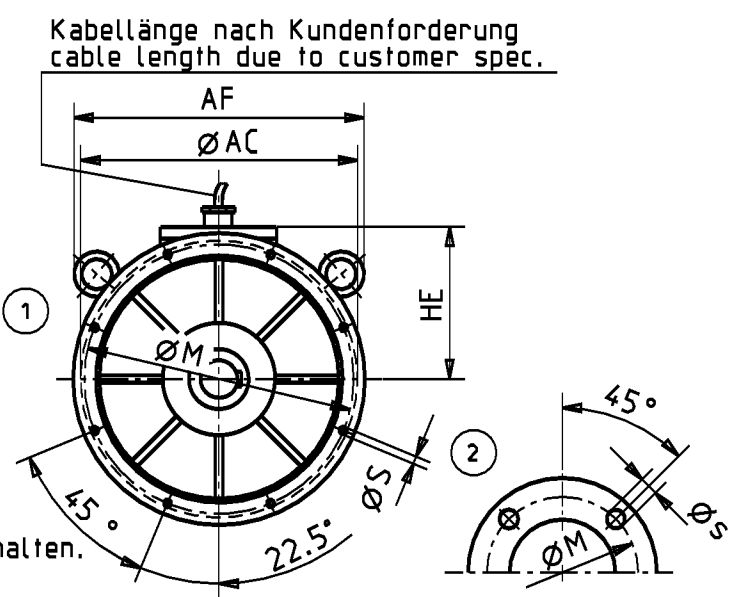
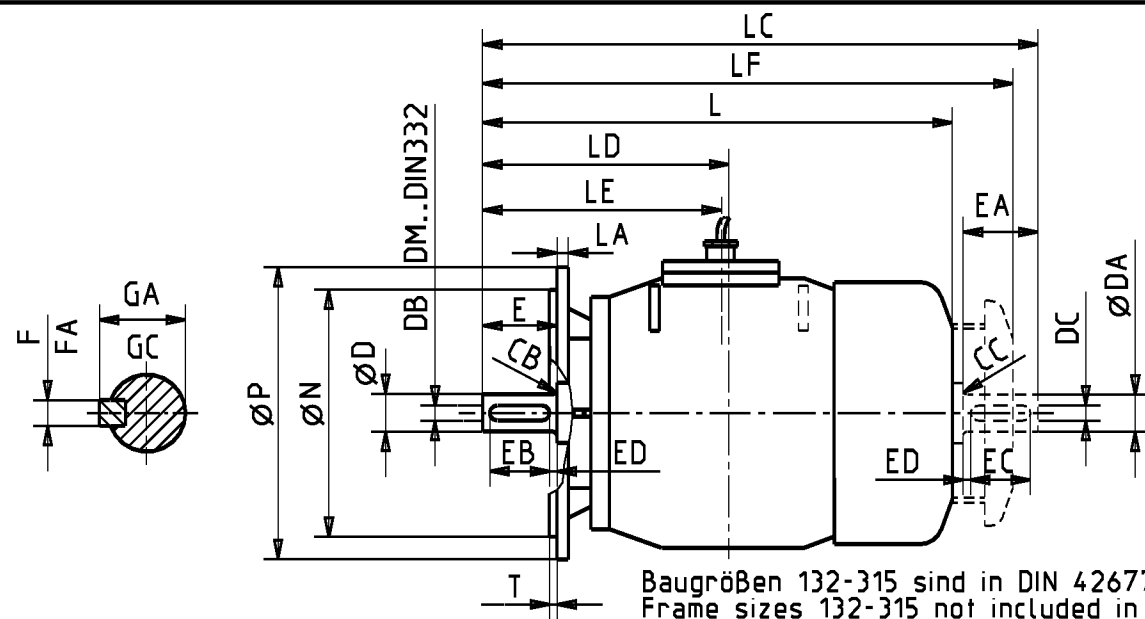
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Letzter Änd.-Index  
Last change index

a

Format DIN A  
Size DIN A

3



Flanschlage: Die Anschraublfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
① Lage der Flanschbohrungen ab Flansch- Ø P=450  
② Lage der Flanschbohrungen bis einschl. Flansch- Ø P=400  
Passung bis N= Ø 250 ISO j6, ab N= Ø 300 ISO h6  
Passfeder DIN 6885  
Passung für Wellenende bis Ø 28 ISO j6, ab Ø 38 ISO k6, über Ø 50 ISO m6  
Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V1 in Schutzart erhöhte Sicherheit EExe oder auf besondere Bestellung  
Baugröße 90 ohne Tragöse  
Bauformen IM V1, IM V3, ab Baugröße 100: 2 Tragösen gegenüberliegend

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400  
Fit up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
Key to DIN 6885  
Shaft end fit up to Ø 28 ISO j6, up to Ø 38 ISO k6, from Ø 50 ISO m6  
Terminal box can be turned 90° in each direction  
Protection hood only with mounting IM V1 in increased safety EExe or upon special request on order  
Frame size 90 without eye bolt  
Mountings IM V1, IM V3, from frame size 100: 2 eye bolt opposite  
1) 2. Wellenende-2. Shaft-end: DA=24, DC=M8, EA=50, GC=27, EC=40, CC=0.4

Baugrößen 132-315 sind in DIN 42677 nicht enthalten.  
Frame sizes 132-315 not included in DIN 42677.

Baugröße frame size	Polzahl number of poles																							Flansch wahlweise, flange optional					
		AC	AF	D DA	DB DC	E EA	EB EC	ED EE	CB CC	F FA	GA GC	HE	L	LA	LC	LD	LE	LF	M	N	P	S	T	LA	M	N	P	S	T
090L.	2-8	186	-	24	M8	50	40	5	0.4	8	27	94	324.5	10	380.5	168.5	168.5	361.5	115	95	140	M8	3	8	100	80	120	M6	3
100L.	2-8	206	213	28 <sup>1)</sup>	M10 <sup>1)</sup>	60 <sup>1)</sup>	50 <sup>1)</sup>	5	0.6 <sup>1)</sup>	8	31 <sup>1)</sup>	103	382.5	10	443	193	193	423	130	110	160	M8	3.5	10	115	95	140	M8	3
112M.	2-8	229	211	28	M10	60	50	5	0.6	8	31	119	389	10	453	200	200	435	130	110	160	M8	3.5	12	165	130	200	M10	3.5
132S.	2-8	270	297	38	M12	80	70	5	0.6	10	41	142	458	11	556	239	239	516	215	180	250	M12	4	12	265	230	300	M12	4
132M.	2-8	270	297	38	M12	80	70	5	0.6	10	41	142	496	11	594	258	258	554	215	180	250	M12	4	12	265	230	300	M12	4
160M.	2 4-8	310	293	42	M16	110	100	5	1	12	45	168	628 580	12	756	323	323	735 619	265	230	300	M12	4	11	215	180	250	M12	4
160L.	2 4-8	310	293	42	M16	110	100	5	1	12	45	168	672 624	12	800	345	345	779 663	265	230	300	M12	4	11	215	180	250	M12	4
180M.	2 4-8	341	334	48	M16	110	100	5	0.6	14	51.5	184	696 646	13	832	351.5	351.5	802.5 690.5	300	250	350	M16	5	12	265	230	300	M12	4
180L.	2 4-8	341	334	48	M16	110	100	5	0.6	14	51.5	184	734 684	13	870	370.5	370.5	840.5 728.5	300	250	350	M16	5	12	265	230	300	M12	4
200L.	2 4-8	392	365	55	M20	110	100	5	1.6	16	59	212	766	15	916	395.5	395.5	840.5	350	300	400	M16	5	15	300	250	350	M16	5
225S.	2 4-8	431	417	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	240	788 818	16	938 998	402 432	402 432	872 902	400	350	450	M16	5	15	350	300	400	M16	5
225M.	2 4-8	431	417	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	240	813 843	16	963 1023	414.5 444.5	414.5 444.5	896.5 926.5	400	350	450	M16	5	15	350	300	400	M16	5
250M.	2 4-8	489	487	60 65	M20	140	125	7.5	1.6	18	64 69	279	937	18	1110	482.5	482.5	1037.5	500	450	550	M16	5	-	-	-	-	-	-
280S.	2 4-8	550	609	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	313	1004	18	1184	514	514	1116	500	450	550	M16	5	-	-	-	-	-	-
280M.	2 4-8	550	609	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	313	1055	18	1235	539.5	539.5	1166.5	500	450	550	M16	5	-	-	-	-	-	-
315S.	2 4-8	622	644	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	358	1110 1200	22	1347 1420	559 589	559 589	1273 1310	600	550	660	M20	6	-	-	-	-	-	-
315M.	2 4-8	622	644	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	358	1161 1251	22	1398 1471	584.5 614.5	584.5 614.5	1324 1361.5	600	550	660	M20	6	-	-	-	-	-	-
315L.	2 4-8	622	644	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	358	1281 1371	22	1524 1591	610 640	584.5 614.5	1444 1534	600	550	660	M20	6	-	-	-	-	-	-

Maß EB, ED, CB nachgetragen.  
Baugrößen 200-315 nachgetragen.  
Änderungs-Bemerkung  
Description of change  
b a  
Änd.-Index  
Change index

**FLENDER  
LOHER**  
Änderungen nur im  
CAD-E vornehmen.

**Bearbeitet, Designed**  
**Geprüft, Checked**  
**Teileklasse** 20501

**Erstellt  
Compiled**  
Datum  
Date

**Name**  
Name

**Datum  
Date**

**Name**  
Name

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Compiled**  
Datum  
Date

**Name**  
Name

**Datum  
Date**

**Name**  
Name

**Bezeichnung**  
Drawing title

**Maßblatt**  
Dimension sheet

**Drehstrommotor mit Käfigläufer**  
**Three-phase-motors with squirrel cage-rotor**  
**Typ/type: A.G./E.G.**  
**Bauform/mounting: IM B14, IM V18, IM V19 DIN 42677**

**Plotdatum**  
Print date

**Plotersteller**  
Printed by

**für Abteilung**  
for Department

**Plotstatus**  
Print status

**Zeichnung-Nr.**  
Drawing No.

**MLA00-0033**

**Blatt**  
Sheet

**de/en**

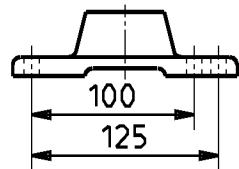
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Language

**Format DIN A**  
Size DIN A

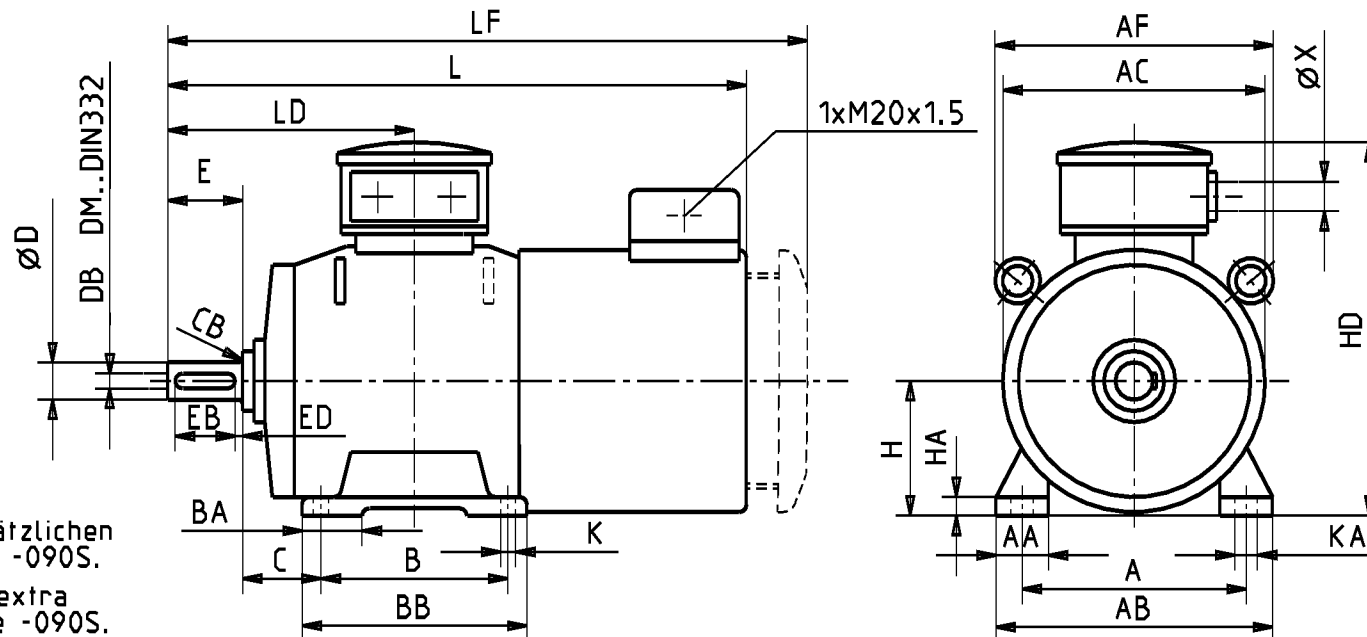
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**Letzter Änd.-Index**  
Last change index

**b**



Gehäusefuß der Baugröße -090L mit zusätzlichen Bohrungen auf BS entsprechend Baulänge -090S.  
Mounting foot of frame size -090L with extra holes at NDE corresponding to frame size -090S.

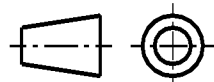


Paßfeder DIN 6885  
Passung für Wellenende bis Ø 28 ISO j6.  
ab Ø 38 ISO k6, über Ø 50 ISO m6  
Klemmenkasten um je 90° drehbar  
Baugröße 90 ohne Tragöse  
Schutzdeckel nur bei Bauform IM V5  
auf besondere Bestellung  
1) Typ ANLA  
2) Typ AMLA  
3) Abweichende Gewindegrößen nach Kunden - Auftrag

Key to DIN 6885  
Shaft end fit up to Ø 28 j6.  
up to Ø 38 ISO k6, from Ø 50 ISO m6  
Terminal box can be turned 90° in each direction  
Frame size 90 without eye bolt  
Protection hood only with mounting IM V5  
upon special request on order  
1) Typ ANLA  
2) Typ AMLA  
3) other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	AF	B	BA	BB	C	D	DB	E	EB	ED	CB	F	GA	H	HA	HD <sup>1)</sup>	HD <sup>2)</sup>	K	KA	L	LD	LF	X <sup>3)</sup>	
90L.	2-8	140	40	180	186	-	125	62	155	56	24	M8	50	40	5	0.4	8	27	90	13	252	266	10.5	12	428	168.5	458	1xM25x1.5	
100L.	2-8	160	45	205	206	213	140	45	170	63	28	M10	60	50	5	0.6	8	31	100	15	271	285	12	18	486	193	514	1xM32x1.5	
112M.	2-8	190	45	230	229	211	140	45	176	70	28	M10	60	50	5	0.6	8	31	112	16	303	303	12	18	495	200	528	2xM32x1.5	
132S.	2-8	216	50	260	270	297	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	16	365	365	12	18	565	239	590	2xM32x1.5	
132M.	2-8	216	50	260	270	297	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	16	365	365	12	18	603	258	628	2xM32x1.5	
160M.	2-8	254	60	310	310	293	210	60	256	108	42	M16	110	100	5	1	12	45	160	20	417	417	15	22	723	323	755	2xM40x1.5	
160L.	2-8	254	60	310	310	293	254	60	300	108	42	M16	110	100	5	1	12	45	160	20	417	417	15	22	767	345	799	2xM40x1.5	
180M.	2-8	279	70	345	341	334	241	80	300	121	48	M16	110	100	5	0.6	14	51.5	180	25	478	478	15	25	788	351.5	820	2xM40x1.5	
180L.	2-8	279	70	345	341	334	279	80	338	121	48	M16	110	100	5	0.6	14	51.5	180	25	478	478	15	25	826	370.5	858	2xM40x1.5	
200L.	2-8	318	80	400	392	365	305	90	365	133	55	M20	110	100	5	1.6	16	59	200	30	525	540	20	26	894	395.5	926	2xM50x1.5	
225S.	$\frac{2}{4-8}$	356	90	450	431	417	286	100	370	149	$\frac{55}{60}$	M20	$\frac{110}{140}$	$\frac{100}{125}$	$\frac{5}{7.5}$	1.6	$\frac{16}{18}$	$\frac{59}{64}$	225	32	575	650	20	26	$\frac{942}{972}$	$\frac{402}{432}$	$\frac{1026}{1056}$	2xM50x1.5	
225M.	$\frac{2}{4-8}$	356	90	450	431	417	311	100	395	149	$\frac{55}{60}$	M20	$\frac{110}{140}$	$\frac{100}{125}$	$\frac{5}{7.5}$	1.6	$\frac{16}{18}$	$\frac{59}{64}$	225	32	575	650	20	26	$\frac{967}{997}$	$\frac{414.5}{444.5}$	$\frac{1051}{1081}$	2xM50x1.5	
250M.	$\frac{2}{4-8}$	406	100	505	489	487	349	100	420	168	$\frac{60}{65}$	M20	140	125	7.5	1.6	18	$\frac{64}{69}$	250	35	650	650	25	36	1059	482.5	1159	2xM63x1.5	
280S.	$\frac{2}{4-8}$	457	110	570	550	609	368	120	470	190	$\frac{65}{75}$	M20	140	125	7.5	1.6	$\frac{18}{20}$	$\frac{69}{79.5}$	280	40	729	729	26	38	1164	514	1276	2xM63x1.5	
280M.	$\frac{2}{4-8}$	457	110	570	550	609	419	120	520	190	$\frac{65}{75}$	M20	140	125	7.5	1.6	$\frac{18}{20}$	$\frac{69}{79.5}$	280	40	729	729	26	38	1215	539.5	1327	2xM63x1.5	

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Letzte Änderung  
Last change

Drehstrommotoren mit Käfigläufer u. Fremdbelüftung  
Three-phase motors with squirrel cage-rotor a. forced ventilation  
Typ/type: ANLA/AMLA  
Bauform/mounting: IM B3, IM V5, IM V6 DIN 42677

Zeichnung-Nr.  
Drawing No.

MLA00-0034

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Sheet

1

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Language

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Teileklasse  
Classification 20501

Bezeichnung  
Drawing title Maßblatt  
Dimension sheet

Plotdatum  
Print date

Plottersteller  
Printed by

für Abteilung  
for Department

Plotstatus  
Print status

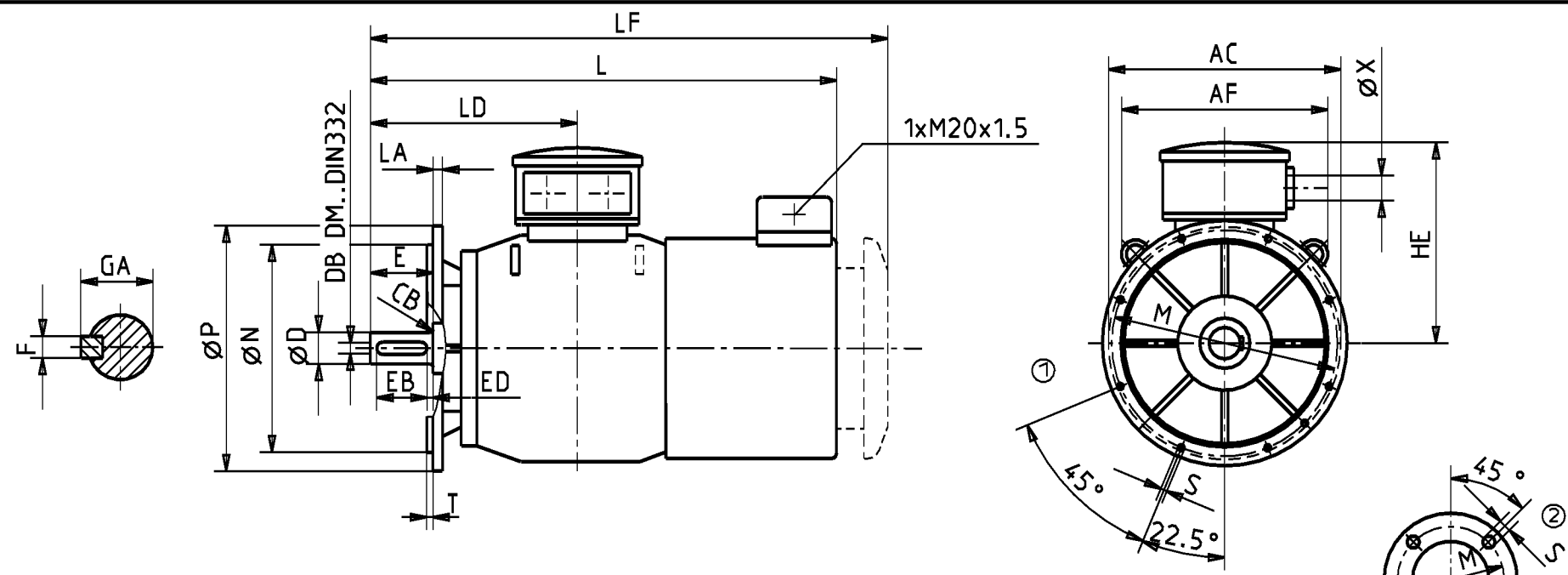
Letzter Änd.-Index  
Last change index

a

Format DIN A  
Size DIN A

3



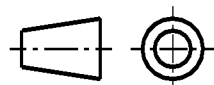


Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
① Lage der Flanschbohrungen ab Flansch-  $\varnothing$  P=450  
② Lage der Flanschbohrungen bis einschl. Flansch-  $\varnothing$  P=400  
Passung bis N=  $\varnothing$  250 ISO j6, ab N=  $\varnothing$  300 ISO h6  
Passfeder DIN 6885  
Passung für Wellenende bis  $\varnothing$  28 ISO j6, ab  $\varnothing$  38 ISO k6, über  $\varnothing$  50 ISO m6  
Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V1 in Schutzart erhöhte Sicherheit EExe oder auf besondere Bestellung  
Baugröße 90 ohne Tragöse  
1) Typ ANLA  
2) Typ AMLA  
3) Abweichende Gewindegrößen nach Kunden - Auftrag

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400  
Fit up to N=  $\varnothing$  250 ISO j6, from N=  $\varnothing$  300 ISO h6  
Key to DIN 6885  
Shaft end fit up to  $\varnothing$  28 ISO j6, up to  $\varnothing$  38 ISO k6, from  $\varnothing$  50 ISO m6  
Terminal box can be turned 90° in each direction  
Protection hood only with mounting IM V1 in increased safety EExe or upon special request on order  
Frame size 90 without eye bolt  
1) Type ANLA  
2) Type AMLA  
3) other thread sizes acc.customer order

Baugröße frame size	Polzahl number of poles	AC	AF		HE <sup>1)</sup>	HE <sup>2)</sup>	L	LA	LD	LF	M	N	P	S	T	X <sup>3)</sup>	Flansch wahlweise, flange optional						D	DB	E	EB	ED	CB	F	GA	
																	LA	M	N	P	S	T									
90L.	2-8	186	-		162	176	428	10	168.5	458	165	130	200	11.5	3.5	1xM25x1.5	11	215	180	250	14	4	24	M8	50	40	5	0.4	8	27	
100L.	2-8	206	213		171	185	486	11	193	514	215	180	250	14	4	1xM32x1.5	-	-	-	-	-	-	28	M10	60	50	5	0.6	8	31	
112M.	2-8	229	211		191	191	495	10	200	528	215	180	250	14	4	2xM32x1.5	13	265	230	300	14	4	28	M10	60	50	5	0.6	8	31	
132S.	2-8	270	297		233	233	565	12	239	590	265	230	300	14	4	2xM32x1.5	11	215	180	250	14	4	38	M12	80	70	5	0.6	10	41	
132M.	2-8	270	297		233	233	603	12	258	628	265	230	300	14	4	2xM32x1.5	11	215	180	250	14	4	38	M12	80	70	5	0.6	10	41	
160M.	2-8	310	293		257	257	723	13	323	755	300	250	350	18	5	2xM40x1.5	11 12	215 265	180 230	250 300	14	4	42	M16	110	100	5	1	12	45	
160L.	2-8	310	293		257	257	767	13	345	799	300	250	350	18	5	2xM40x1.5	11 12	215 265	180 230	250 300	14	4	42	M16	110	100	5	1	12	45	
180M.	2-8	341	334		298	298	788	13	351.5	820	300	250	350	18	5	2xM40x1.5	12 16	265 400	230 350	300 450	14 18	4 5	48	M16	110	100	5	0.6	14	51.5	
180L.	2-8	341	334		298	298	826	13	370.5	858	300	250	350	18	5	2xM40x1.5	12 16	265 400	230 350	300 450	14 18	4 5	48	M16	110	100	5	0.6	14	51.5	
200L.	2-8	392	365		325	340	894	15	395.5	926	350	300	400	18	5	2xM50x1.5	15 16	300 400	250 350	350 450	18	5	55	M20	110	100	5	1.6	16	59	
225S.	2 4-8	431	417		350	425	942 972	16	402 432	1026 1056	400	350	450	18	5	2xM50x1.5	15	350	300	400	18	5	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	
225M.	2 4-8	431	417		350	425	967 997	16	414.5 444.5	1051 1081	400	350	450	18	5	2xM50x1.5	15	350	300	400	18	5	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	
250M.	2 4-8	489	487		400	400	1059	18	482.5	1159	500	450	550	18	5	2xM63x1.5	-	-	-	-	-	-	60 65	M20	140	125	7.5	1.6	18	64 69	
280S.	2 4-8	550	609		449	449	1164	18	514	1239	500	450	550	18	5	2xM63x1.5	-	-	-	-	-	-	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	
280M.	2 4-8	550	609		449	449	1215	18	539.5	1290	500	450	550	18	5	2xM63x1.5	-	-	-	-	-	-	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	

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Letzte Änderung  
Last change

Drehstrommotoren mit Käfigläufer u. Fremdbelüftung  
Three-phase motors with squirrel cage-rotor a. forced ventilation  
Typ/type: ANLA-AMLA  
Bauform/mounting: IM B5, IM V1, IM V3 DIN 42677

Zeichnung-Nr.  
Drawing No.

MLA00-0035

Blatt  
Sheet

Sprache  
Language

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05.11.03 IMT26KA 03.12.03 IMT26KA  
05.11.03 IMT2 03.12.03 IMT

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Teileklasse  
Classification

20501

Bezeichnung  
Drawing title

Maßblatt  
Dimension sheet

Plotdatum  
Print date

Plottersteller  
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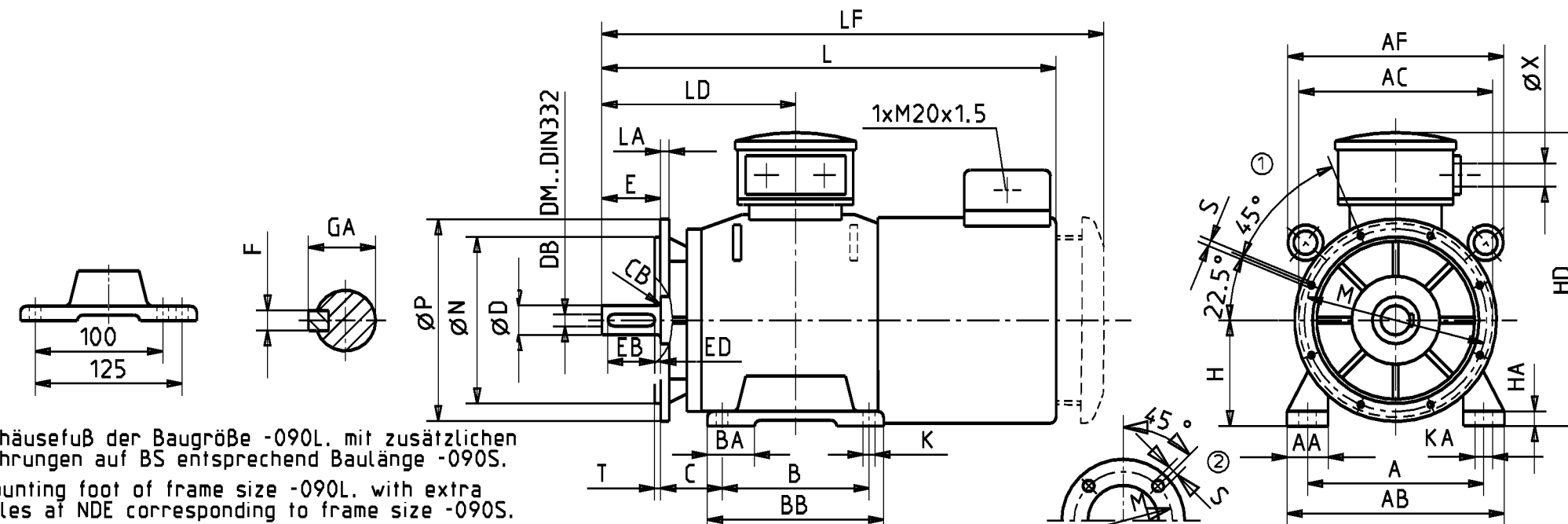
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Letzter Änd.-Index  
Last change index

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Size DIN A

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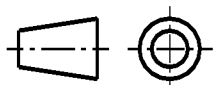
Gehäusefuß der Baugröße -090L mit zusätzlichen Bohrungen auf BS entsprechend Baulänge -090S.  
Mounting foot of frame size -090L with extra holes at NDE corresponding to frame size -090S.

Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
① Lage der Flanschbohrungen ab Flansch-Ø P=450  
② Lage der Flanschbohrungen bis einschl. Flansch-Ø P=400  
Passung bis N= Ø 250 ISO j6, ab N= Ø 300 ISO h6  
Passfeder DIN 6885  
Passung für Wellenende bis Ø 28 ISO j6, ab Ø 38 ISO k6, über Ø 50 ISO m6  
Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V1 in Schutzart erhöhte Sicherheit EExe oder auf besondere Bestellung  
Baugröße 90 ohne Tragöse  
1) Typ ANL./ ENL.  
2) Typ AML./ EML.  
3) Abweichende Gewindegrößen nach Kunden - Auftrag

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400  
Fit up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
Key to DIN 6885  
Shaft end fit up to Ø 28 ISO j6, up to Ø 38 ISO k6, from Ø 50 ISO m6  
Terminal box can be turned 90° in each direction  
Protection hood only with mounting IM V1 in increased safety EExe or upon special request on order  
Frame size 90 without eye bolt  
1) Type ANL./ ENL.  
2) Type AML./ EML.  
3) other thread sizes acc.customer order

Typ type	Polzahl number of poles	A	AA	AB	AC	AF	B	BA	BB	C	D	DB	E	EB	ED	CB	F	GA	H	HA	HD <sup>1)</sup>	HD <sup>2)</sup>	K	KA	L	LA	LD	LF	M	N	P	S	T	X <sup>3)</sup>	Flansch wahlweise, flange optional					
		LA	M	N	P	S	T																																	
A.LA- 90L.	2-8	140	40	180	186	-	125	62	155	56	24	M8	50	40	5	0.4	8	27	90	13	252	266	10.5	12	428	10	168.5	458	165	130	200	11.5	3.5	1xM25x1.5	11	215	180	250	14	4
A.LA- 100L.	2-8	160	45	205	206	213	140	45	170	63	28	M10	60	50	5	0.6	8	31	100	15	271	285	12	18	486	11	193	514	215	180	250	14	4	1xM32x1.5	-	-	-	-	-	-
A.LA- 112M.	2-8	190	45	230	229	211	140	45	176	70	28	M10	60	50	5	0.6	8	31	112	16	303	303	12	18	495	10	200	528	215	180	250	14	4	2xM32x1.5	13	265	230	300	14	4
A.LA- 132S.	2-8	216	50	260	270	297	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	16	365	365	12	18	565	12	239	590	265	230	300	14	4	2xM32x1.5	11	215	180	250	14	4
A.LA- 132M.	2-8	216	50	260	270	297	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	16	365	365	12	18	603	12	258	628	265	230	300	14	4	2xM32x1.5	11	215	180	250	14	4
A.LA- 160M.	2-8	254	60	310	310	293	210	60	256	108	42	M16	110	100	5	1	12	45	160	20	417	417	15	22	723	13	323	755	300	250	350	18	5	2xM40x1.5	11 12	215 265	180 230	250 300	14	4
A.LA- 160L.	2-8	254	60	310	310	293	254	60	300	108	42	M16	110	100	5	1	12	45	160	20	417	417	15	22	767	13	345	799	300	250	350	18	5	2xM40x1.5	11 12	215 265	180 230	250 300	14	4
ANL./EML.-180M.	2 4-8	279	70	345	341	334	241	80	300	121	48	M16	110	100	5	0.6	14	51.5	180	25	478	478	15	25	788	13	351.5	820	300	250	350	18	5	2xM40x1.5	12 16	265 400	230 350	300 450	14 18	4 5
ANL./EML.-180L.	2 4-8	279	70	345	341	334	279	80	338	121	48	M16	110	100	5	0.6	14	51.5	180	25	478	478	15	25	826	13	370.5	858	300	250	350	18	5	2xM40x1.5	12 16	265 400	230 350	300 450	14 18	4 5
ANL./EML.-200L.	2 4-8	318	80	400	392	365	305	90	365	133	55	M20	110	100	5	1.6	16	59	200	30	525	540	20	26	894	15	395.5	926	350	300	400	18	5	2xM50x1.5	15 16	300 400	250 350	350 450	18	5
ANL./EML.-225S.	2 4-8	356	90	450	431	417	286	100	370	149	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	225	32	575	650	20	26	942 972	16	402 432	1026 1056	400	350	450	18	5	2xM50x1.5	15	350	300	400	18	5
ANL./EML.-225M.	2 4-8	356	90	450	431	417	311	100	395	149	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	225	32	575	650	20	26	967 997	16	414.5 444.5	1051 1081	400	350	450	18	5	2xM50x1.5	15	350	300	400	18	5
ANL./EML.-250M.	2 4-8	406	100	505	489	487	349	100	420	168	60 65	M20	140	125	7.5	1.6	18	64 69	250	35	650	650	25	36	1059	18	482.5	1159	500	450	550	18	5	2xM63x1.5	-	-	-	-	-	-
ANL./EML.-280S.	2 4-8	457	110	570	550	609	368	120	470	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	729	729	26	38	1164	18	514	1276	500	450	550	18	5	2xM63x1.5	-	-	-	-	-	-
ANL./EML.-280M.	2 4-8	457	110	570	550	609	419	120	520	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	729	729	26	38	1215	18	539.5	1327	500	450	550	18	5	2xM63x1.5	-	-	-	-	-	-

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Erstellt  
Compiled

Letzte Änderung  
Last change

Drehstrommotoren mit Käfigläufer u. Fremdbelüftung  
Three-phase motors with squirrel cage-rotor a. forced ventilation  
Typ/type: ANLA/AMLA  
Bauform/mounting: IM B35, IM V15, IM V36 DIN 42673 u. DIN 42677

Zeichnung-Nr.  
Drawing No.

MLA00-0036

Blatt  
Sheet

Sprache  
Language

de/en

Diese technische Unterlage hat  
gesetzlichen Schutz (DIN34).

Bearbeitet, Designed  
Geprüft, Checked

06.11.03 IMT26KA 04.12.03 IMT26KA  
06.11.03 IMT2HK 04.12.03 IMT

Plotdatum  
Print date

Plottersteller  
Printed by

für Abteilung  
for Department

Plotstatus  
Print status

Letzter Änd.-Index  
Last change index

a

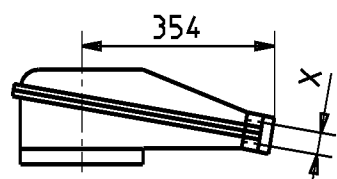
Format DIN A  
Size DIN A

3

Teileklasse  
Classification 20501

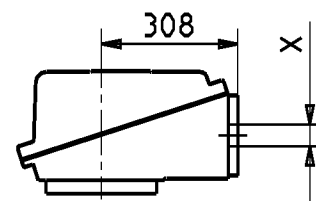
Bezeichnung  
Drawing title Maßblatt  
Dimension sheet



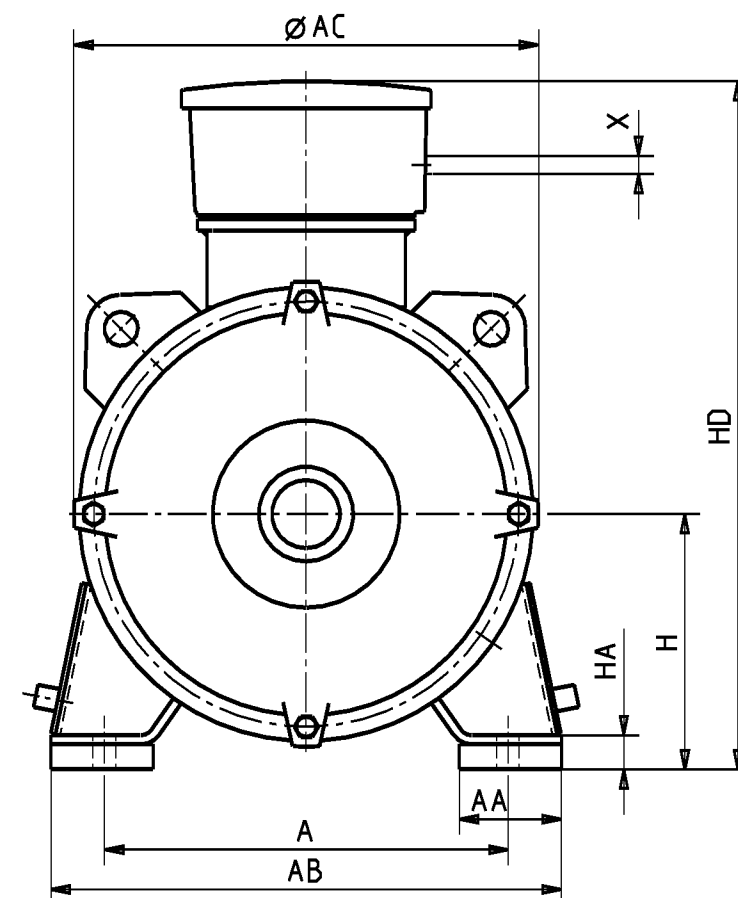
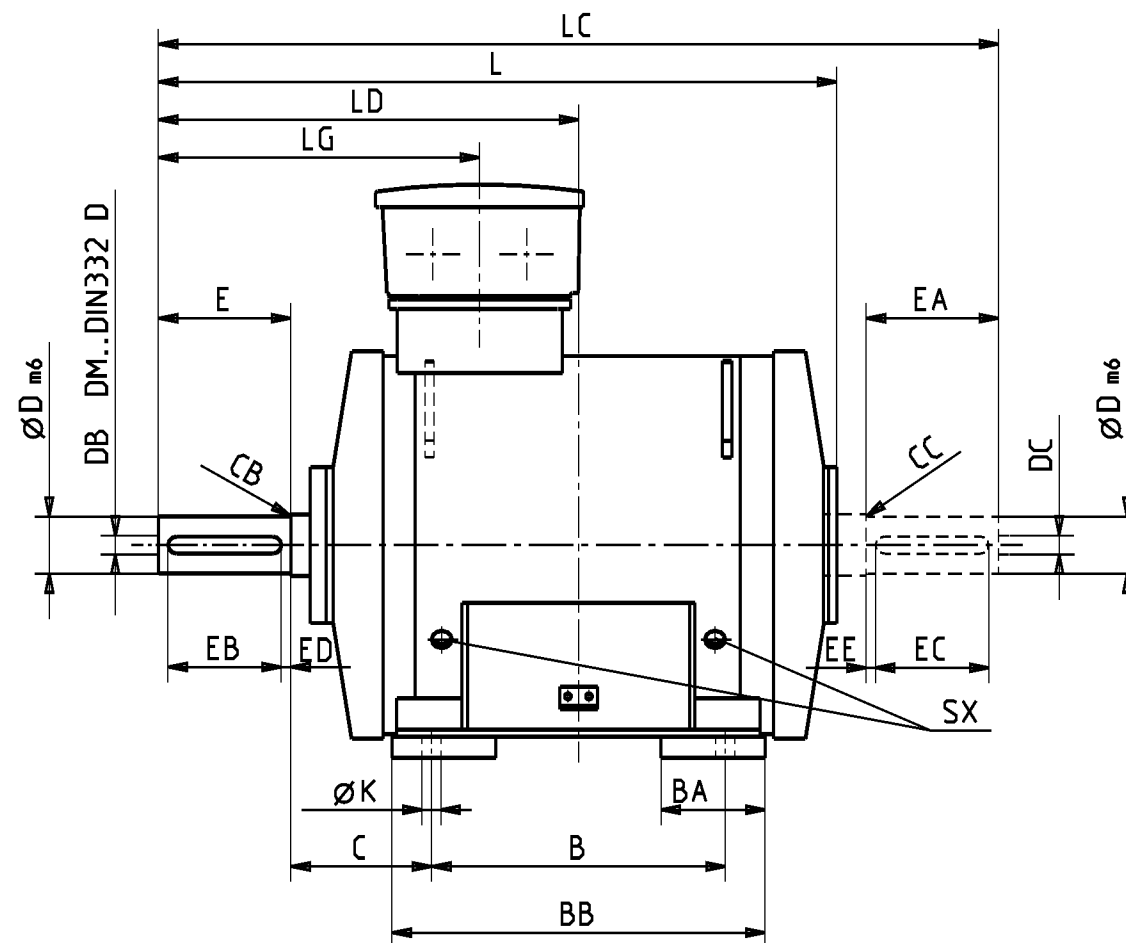
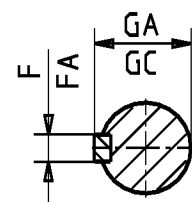


Nur für VIK-Ausführung  
bei Baugröße 315 - 355

Only for VIK-design  
for frame size 315 - 355



Klemmenkasten für  
Baugröße 315L-355L  
Terminal box for  
frame size 315L-355L



Paßfeder DIN 6885  
Klemmenkasten um je 90° drehbar

max. Kühlwassereintritts-  
temperatur 25°C

max. zulässiger Sinkstoffgehalt 10mg/l

Key to DIN 6885  
Terminal box can be turned 90°  
in each direction

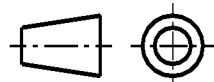
cooling water inlet  
temperature max. 25°C

permissible sediment max. 10mg/l

1) Abweichende Gewindegrößen nach Kunden-Auftrag  
other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	B	A	HA	BB	AB	AC	H	BA	AA	HD	L	LC	LD	K	X <sup>1)</sup>	C	DB DC	D DA	E EA	EB EC	ED EE	CB CC	GA GC	F FA	LG	SX	
200L	2-8	305	318	25	365	400	370	200	100	80	562	660	791	395.5	20	2xM50x1.5	133	M20	55	110	100	5	1.6	59	16	282	G 1/2"	
225S	2 4-8	286	356	25	370	450	410	225	110	90	610	668 698	804 864	402 432	20	2xM50x1.5	149	M20	55 60	110 140	100 125	5 7.5	1.6	59 64	16 18	332 362	G 1/2"	
225M	2 4-8	311	356	25	395	450	410	225	110	90	610	693 723	829 889	414.5 444.5	20	2xM50x1.5	149	M20	55 60	110 140	100 125	5 7.5	1.6	59 64	16 18	332 362	G 1/2"	
250M	2 4-8	349	406	30	420	505	490	250	110	100	702	796	965	482.5	26	2xM63x1.5	168	M20	60 65	140	125	7.5	1.6	64 69	18	390	G 1/2"	
280S	2 4-8	368	457	30	470	570	520	280	120	110	759	885	1028	514	26	2xM63x1.5	190	M20	65 75	140	125	7.5	1.6	69 79.5	18 20	438	G 1/2"	
280M	2 4-8	419	457	30	520	570	520	280	120	110	759	935	1079	539.5	26	2xM63x1.5	190	M20	65 75	140	125	7.5	1.6	69 79.5	18 20	438	G 1/2"	
315S	2 4-8	406	508	30	520	630	596	315	130	120	864	975 1005	1118 1178	559 589	27	2xM63x1.5	216	M20	65 80	140 170	125 140	7.5 15	1.6	69 85	18 22	450 480	G 3/4"	
315M	2 4-8	457	508	30	570	630	596	315	130	120	864	1026 1056	1169 1229	584.5 614.5	27	2xM63x1.5	216	M20	65 80	140 170	125 140	7.5 15	1.6	69 85	18 22	450 480	G 3/4"	
315L	2 4-8	508	508	30	621	630	596	315	130	120	911	1146 1176	1289 1349	610 640	27	2xM63x1.5	216	M20	65 80	140 170	125 140	7.5 15	1.6	69 85	18 22	450 480	G 3/4"	
355M	2 4-12	560	610	30	650	700	650	355	150	120	1013	1295 1325	1348 1408	674 704	28	2xM63x1.5	254	M20 M24	75 90	140 170	125 140	7.5 15	1.6 2.5	79.5 95	20 25	456 486	G 3/4"	
355L	2 4-12	630	610	30	720	700	650	355	150	120	1013	1365 1395	1418 1478	709 739	28	2xM63x1.5	254	M20 M24	75 90	140 170	125 140	7.5 15	1.6 2.5	79.5 95	20 25	456 486	G 3/4"	

FLENDER  
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Erstellt  
Compiled

Letzte Änderung  
Last change

Datum  
Date

Name  
Name

Datum  
Date

Name  
Name

Wassergekühlter Drehstrommotor

Water cooled three-phase motor

Typ/type: A.W.

Bauform/mounting: IM B3

Zeichnung-Nr.  
Drawing No.

MLA00-0037

Blatt  
Sheet

Sprache  
Language

de/en

Diese technische Unterlage hat  
gesetzlichen Schutz (DIN34).

Bearbeitet, Designed

15.07.02 Schiestl K. 02.12.03 IMT26KA

Geprüft, Checked

15.07.02 IMT2HK 02.12.03 IMT

This technical document  
is proprietary (DIN34).

Teileklasse  
Classification

20501

Bezeichnung  
Drawing title

Maßblatt  
Dimension sheet

Plotdatum  
Print date

Plotsteller  
Printed by

für Abteilung  
for Department

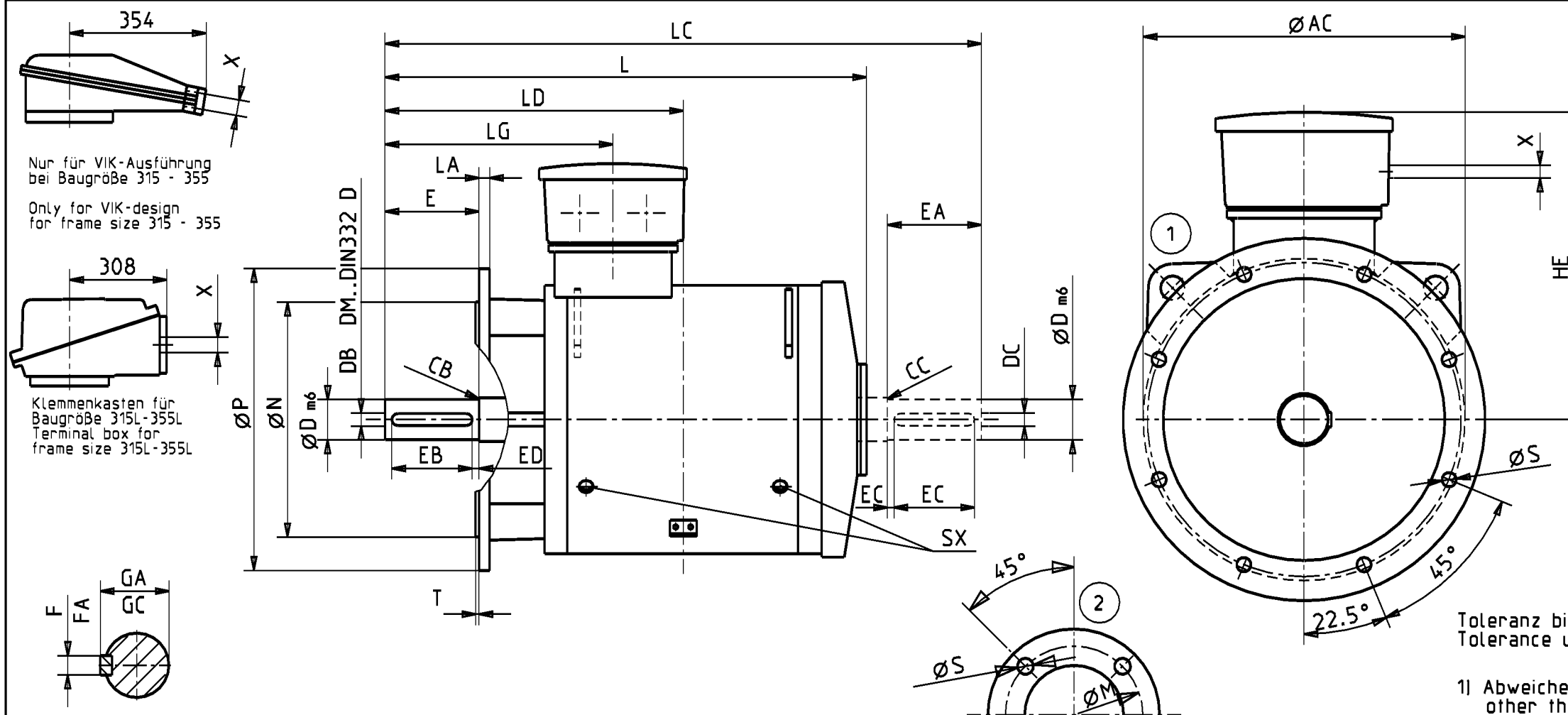
Plotstatus  
Print status

Letzter Änd.-Index  
Last change index

b

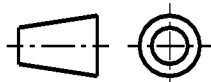
Format DIN A  
Size DIN A

3



Baugröße frame size	Polzahl number of poles	P	N	LA	M	T	AC	HE	L	LC	LD	X <sup>1)</sup>	S	DB DC	D DA	E EA	EB EC	ED EE	CB CC	GA GC	F FA	LG	SX					
200L	2-8	400	300	15	350	5	370	362	660	791	395.5	2xM50x1.5	18	M20	55	110	100	5	1.6	59	16	282	G 1/2"					
225S	2 4-8	450	350	16	400	5	410	385	668 698	804 864	402 432	2xM50x1.5	18	M20	55 60	110 140	100 125	5 7.5	1.6	59 64	16 18	332 362	G 1/2"					
225M	2 4-8	450	350	16	400	5	410	385	693 723	829 889	414.5 444.5	2xM50x1.5	18	M20	55 60	110 140	100 125	5 7.5	1.6	59 64	16 18	332 362	G 1/2"					
250M	2 4-8	550	450	18	500	5	490	452	796	965	482.5	2xM63x1.5	18	M20	60 65	140	125	7.5	1.6	64 69	18	390	G 1/2"					
280S	2 4-8	550	450	18	500	5	520	479	885	1028	514	2xM63x1.5	18	M20	65 75	140	125	7.5	1.6	69 79.5	18 20	438	G 1/2"					
280M	2 4-8	550	450	18	500	5	520	479	935	1079	539.5	2xM63x1.5	18	M20	65 75	140	125	7.5	1.6	69 79.5	18 20	438	G 1/2"					
315S	2 4-8	660	550	22	600	6	596	549	975 1005	1118 1178	559 589	2xM63x1.5	23	M20	65 80	140 170	125 140	7.5 15	1.6	69 85	18 22	450 480	G 3/4"					
315M	2 4-8	660	550	22	600	6	596	549	1026 1056	1169 1229	584.5 614.5	2xM63x1.5	23	M20	65 80	140 170	125 140	7.5 15	1.6	69 85	18 22	450 480	G 3/4"					
315L	2 4-8	660	550	22	600	6	596	596	1146 1176	1289 1349	610 640	2xM63x1.5	23	M20	65 80	140 170	125 140	7.5 15	1.6	69 85	18 22	450 480	G 3/4"					
355M	2 4-12	800	680	25	740	6	650	658	1295 1325	1348 1408	674 704	2xM63x1.5	24	M20 M24	75 90	140 170	125 140	7.5 15	1.6 2.5	79.5 95	20 25	456 486	G 3/4"					
355L	2 4-12	800	680	25	740	6	650	658	1365 1395	1418 1478	709 739	2xM63x1.5	24	M20 M24	75 90	140 170	125 140	7.5 15	1.6 2.5	79.5 95	20 25	456 486	G 3/4"					

**FLENDER  
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Erstellt  
Compiled

Letzte Änderung  
Last change

Wassergekühlter Drehstrommotor  
Water cooled three-phase motor

Typ/type: A.W.

Bauform/mounting: IM B5, IM V1, IM V3

Zeichnung-Nr.  
Drawing No.

MLA00-0038

Blatt  
Sheet

b

Sprache  
Language

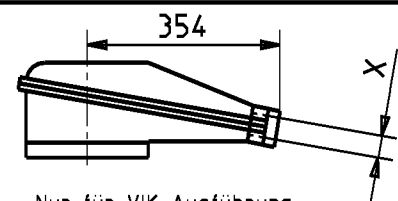
de/en

Letzter Änd.-Index  
Last change index

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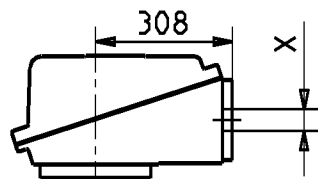
Format DIN A  
Size DIN A

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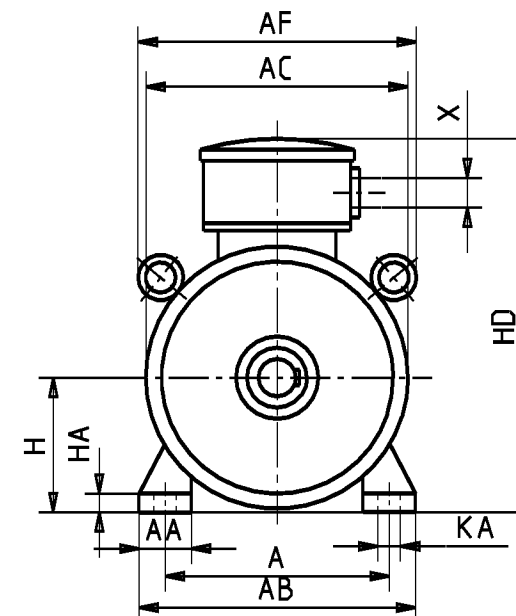
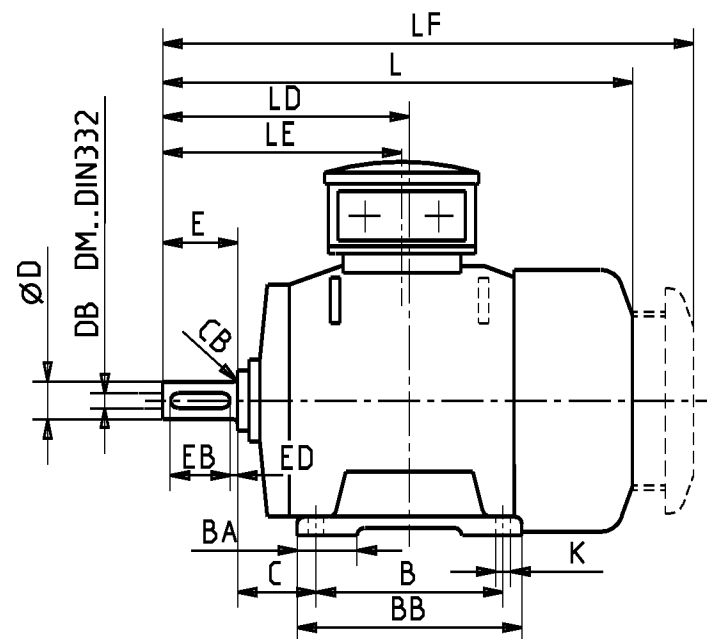
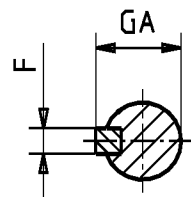


Nur für VIK-Ausführung  
bei Baugröße 315-355

Only for VIK-design  
for frame size 315-355



Klemmenkasten für  
Baugröße 315L-355L  
Terminal box for  
frame size 315L-355L



Paßfeder DIN 6885  
Toleranz für Wellenende bis  $\varnothing 28$  ISO j6,  
ab  $\varnothing 38$  ISO k6, über  $\varnothing 50$  ISO m6  
Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V5 in Schutzart  
erhöhte Sicherheit EExe oder auf besondere Bestellung  
Baugröße 90 ohne Tragöse  
Bauformen IM V1, IM V3, ab Baugröße 132:  
2 Tragösen gegenüberliegend

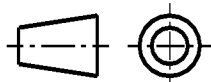
Key to DIN 6885  
Shaft end tolerance up to  $\varnothing 28$  ISO j6,  
up to  $\varnothing 38$  ISO k6, from  $\varnothing 50$  ISO m6  
Terminal box can be turned 90° in each direction  
Protection hood only with mounting Im V5 in increased  
saftey EExe or upon special request on order  
Frame size 90 without eye bolt  
Mountings IM V1, IM V3, from frame size 132:  
2 eye bolt opposite

2) Typ/Type: ANG./ENG.  
3) Typ/Type: AMG./EMG.  
4) 315...02: alternativ geschweißt  
alternatively welded

6) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	AF	B	BA	BB	C	D	DB	E	EB	ED	CB	F	GA	H	HA	HD <sup>2)</sup>	HD <sup>3)</sup>	K	KA	L	LD	LF	LE	X <sup>6)</sup>
132S.	2	216	50	260	270	297	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	16	364	364	12	18	503	239	561	239	2xM32x1.5
132M.	2	216	50	260	270	297	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	16	364	364	12	18	541	258	599	258	2xM32x1.5
160M.	2	254	60	310	310	293	210	60	256	108	42	M16	110	100	5	1	12	45	160	20	418	418	15	22	675	323	782	323	2xM40x1.5
160L.	2	254	60	310	310	293	254	60	300	108	42	M16	110	100	5	1	12	45	160	20	418	418	15	22	719	345	826	345	2xM40x1.5
180M.	2	279	70	345	341	334	241	80	300	121	48	M16	110	100	5	0.6	14	51.5	180	25	477	477	15	25	733	351.5	840	351.5	2xM40x1.5
180L.	2	279	70	345	341	334	279	80	338	121	48	M16	110	100	5	0.6	14	51.5	180	25	477	477	15	25	771	370.5	878	370.5	2xM40x1.5
200L.	2	318	80	400	392	365	305	90	365	133	55	M20	110	100	5	1.6	16	59	200	30	525	525	20	26	869	395.5	1046	395.5	2xM50x1.5
225S.	2	356	90	450	431	417	286	100	370	149	55	M20	110	100	5	1.6	16	59	225	32	578	578	20	26	889	402	1099	402	2xM50x1.5
225M.	2	356	90	450	431	417	311	100	395	149	55	M20	110	100	5	1.6	16	59	225	32	578	578	20	26	914	414.5	1124	414.5	2xM50x1.5
250M.	2	406	100	505	489	487	349	100	420	168	60	M20	140	125	7.5	1.6	18	64	250	35	654	654	25	36	1034	482.5	1274	482.5	2xM63x1.5
280S.	2	457	110	570	550	609	368	120	470	190	65	M20	140	125	7.5	1.6	18	69	280	40	729	729	26	38	1069	514	1211	514	2xM63x1.5
280M.	2	457	110	570	550	609	419	120	520	190	65	M20	140	125	7.5	1.6	18	69	280	40	729	729	26	38	1120	539.5	1262	539.5	2xM63x1.5
315S.	2	508	120	630	622	644	406	130	520	216	65	M20	140	125	7.5	1.6	18	69	315	45	809	946	30	40	1240	559	1493	559	2xM63x1.5
315M.	2	508	120	630	622	644	457	130	570	216	65	M20	140	125	7.5	1.6	18	69	315	45	809	946	30	40	1291	584.5	1544	584.5	2xM63x1.5
315L.	2	508	120	630	622	644	508	130	621	216	65	M20	140	125	7.5	1.6	18	69	315	45	946	946	30	40	1417	610	1660	584.5	2xM63x1.5
355M.	2	610	120	730	700	635	560	150	650	254	75	M20	140	125	7.5	1.6	20	79.5	355	50	968	968	30	40	1505	674	1695	674	2xM63x1.5
355L.	2	610	120	730	700	635	630	150	720	254	75	M20	140	125	7.5	1.6	20	79.5	355	50	968	968	30	40	1575	709	1800	709	2xM63x1.5

**FLENDER  
LOHER**



Änderungen nur im  
CAD-E vornehmen.

Erstellt  
Compiled

Letzte Änderung  
Last change

Datum  
Date

Name  
Name

Datum  
Date

Name  
Name

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: A.G./E.G. 4) A.S./E.S., Geräuschgüte 3, Noise grade 3  
Bauform/mounting: IM B3, IM V5, IM V6 DIN 42673

Zeichnung-Nr.  
Drawing No.

**MLA00-0061**

Blatt  
Sheet

Sprache  
Language

de/en

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This technical document  
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Bearbeitet, Designed  
Geprüft, Checked  
Teileklasse  
Classification 20501

Bezeichnung  
Drawing title  
**Maßblatt  
Dimension sheet**

Plotdatum  
Print date

Plottersteller  
Printed by

für Abteilung  
for Department

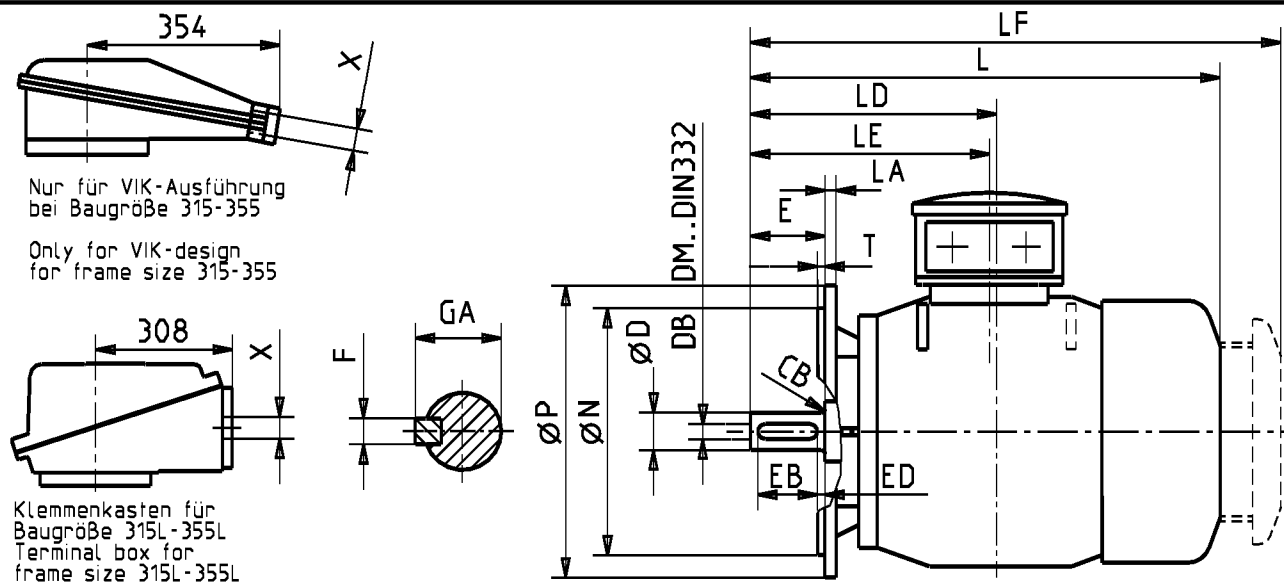
Plotstatus  
Print status

Letzter Änd.-Index  
Last change index

b

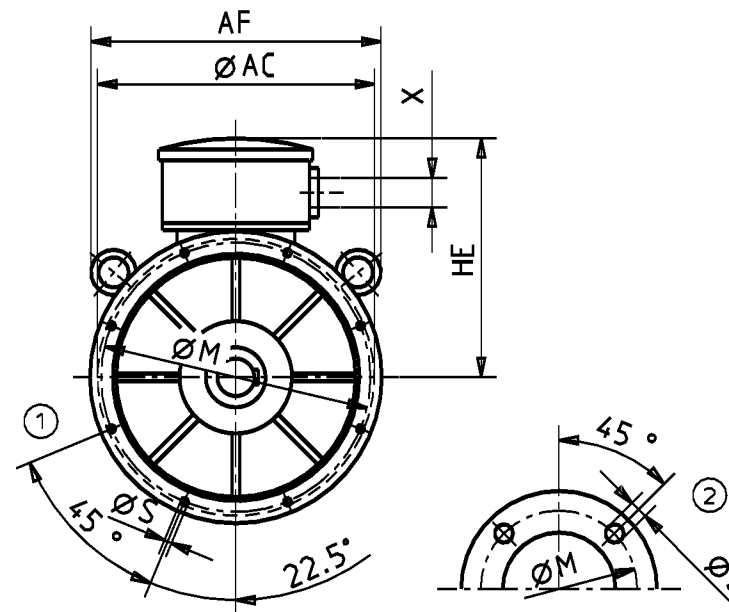
Format DIN A  
Size DIN A

3



- 3) 315...-02: alternativ geschweißt/alternatively welded  
4) Typ/Type: ANG./ENG.  
5) Typ/Type: AMG./EMG.

7) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order



Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
① Lage der Flanschbohrungen ab Flansch- Ø P=450  
② Lage der Flanschbohrungen bis einschl. Flansch- Ø P=400  
Toleranz bis N= Ø 250 ISO j6, ab N= Ø 300 ISO h6  
Passfeder DIN 6885  
Toleranz für Wellenende bis Ø 28 ISO j6,  
ab Ø 38 ISO k6, über Ø 50 ISO m6  
Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V1 in Schutzart  
erhöhte Sicherheit EExe oder auf besondere Bestellung

Bauformen IM V1, IM V3, ab Baugröße 132: 2 Tragösen gegenüberliegend.

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder

- ① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400  
Tolerance up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6

Key to DIN 6885

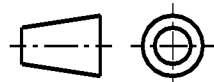
Shaft end tolerance up to Ø 28 ISO j6  
up to Ø 38 ISO k6, from Ø 50 ISO m6

Terminal box can be turned 90° in each direction  
Protection hood only with mounting IM V1 in increased safety EExe or upon special request on order

Mountings IM V1, IM V3, from frame size 132: 2 eye bolt opposite.

Baugröße frame size	Polzahl number of poles	Flansch wahlweise, flange optional																												
		AC	AF	D	DB	E	EB	ED	CB	F	GA	HE <sup>4)</sup>	HE <sup>5)</sup>	L	LA	LD	LE	LF	M	N	P	S	T	X <sup>7)</sup>	LA	M	N	P	S	T
132S.	2	270	297	38	M12	80	70	5	0.6	10	41	232	232	503	12	239	239	561	265	230	300	14	4	1xM32x1.5	11	215	180	250	14	4
132M.	2	270	297	38	M12	80	70	5	0.6	10	41	232	232	541	12	258	258	599	265	230	300	14	4	1xM32x1.5	11	215	180	250	14	4
160M.	2	310	293	42	M16	110	100	5	1	12	45	258	258	675	13	323	323	782	300	250	350	18	5	2xM40x1.5	11	215	180	250	14	4
																									12	265	230	300	14	4
160L.	2	310	293	42	M16	110	100	5	1	12	45	258	258	719	13	345	345	826	300	250	350	18	5	2xM40x1.5	11	215	180	250	14	4
																									12	265	230	300	14	4
180M.	2	341	334	48	M16	110	100	5	0.6	14	51.5	297	297	733	13	351.5	351.5	840	300	250	350	18	5	2xM40x1.5	12	265	230	300	14	4
																									16	400	350	450	18	5
180L.	2	341	334	48	M16	110	100	5	0.6	14	51.5	297	297	771	13	370.5	370.5	878	300	250	350	18	5	2xM40x1.5	12	265	230	300	14	4
																									16	400	350	450	18	5
200L.	2	392	365	55	M20	110	100	5	1.6	16	59	325	325	869	15	395.5	395.5	1046	350	300	400	18	5	2xM50x1.5	15	300	250	350	18	5
																									16	400	350	450	18	5
225S.	2	431	417	55	M20	110	100	5	1.6	16	59	353	353	889	16	402	402	1099	400	350	450	18	5	2xM50x1.5	15	350	300	400	18	5
225M.	2	431	417	55	M20	110	100	5	1.6	16	59	353	353	914	16	414.5	414.5	1124	400	350	450	18	5	2xM50x1.5	15	350	300	400	18	5
250M.	2	489	487	60	M20	140	125	7.5	1.6	18	64	404	404	1034	18	482.5	482.5	1274	500	450	550	18	5	2xM63x1.5	-	-	-	-	-	-
280S.	2	550	609	65	M20	140	125	7.5	1.6	18	69	449	449	1069	18	514	514	1211	500	450	550	18	5	2xM63x1.5	-	-	-	-	-	-
280M.	2	550	609	65	M20	140	125	7.5	1.6	18	69	449	449	1120	18	539.5	539.5	1262	500	450	550	18	5	2xM63x1.5	-	-	-	-	-	-
315S.	2	622	644	65	M20	140	125	7.5	1.6	18	69	494	631	1240	22	559	559	1493	600	550	660	23	6	2xM63x1.5	-	-	-	-	-	-
315M.	2	622	644	65	M20	140	125	7.5	1.6	18	69	494	631	1291	22	584.5	584.5	1544	600	550	660	23	6	2xM63x1.5	-	-	-	-	-	-
315L.	2	622	644	65	M20	140	125	7.5	1.6	18	69	631	631	1417	22	610	584.5	1660	600	550	660	23	6	2xM63x1.5	-	-	-	-	-	-
355M.	2	700	635	75	M20	140	125	7.5	1.6	20	79.5	631	631	1505	25	674	674	1695	740	680	800	24	6	2xM63x1.5	-	-	-	-	-	-
355L.	2	700	635	75	M20	140	125	7.5	1.6	20	79.5	631	631	1575	25	709	709	1800	740	680	800	24	6	2xM63x1.5	-	-	-	-	-	-

FLENDER  
LOHER



Erstellt  
Compiled

Letzte Änderung  
Last change

Drehstrommotor mit Käfigläufer  
Three-phase-motors with squirrel cage-rotor  
Typ/type: A.G./E.G. 3) A.S./E.S., Geräuschgüte3, Noise grade 3  
Bauform/mounting: IM B5, IM V1, IM V3 DIN 42677

Zeichnung-Nr.  
Drawing No.

MLA00-0062

Blatt  
Sheet

Sprache  
Language

de/en

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Geprüft, Checked  
Teileklasse  
Classification 20501

Bezeichnung  
Drawing title Maßblatt  
Dimension sheet

Plotdatum  
Print date

Plottersteller  
Printed by

für Abteilung  
for Department

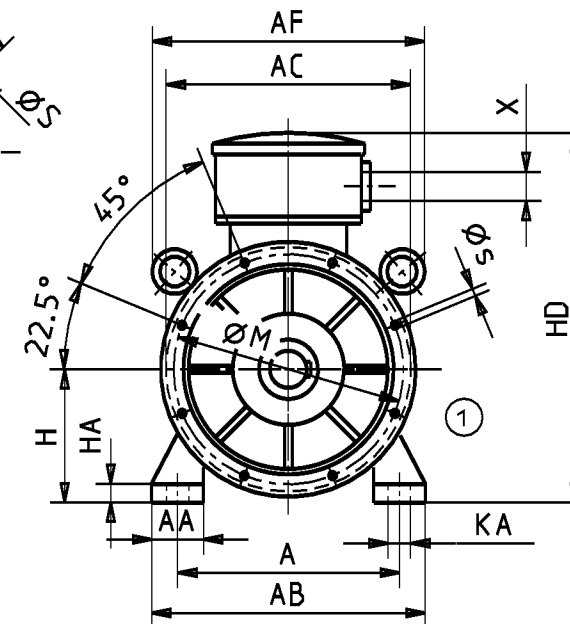
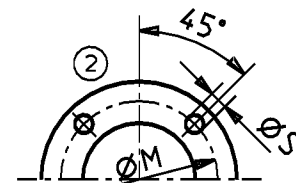
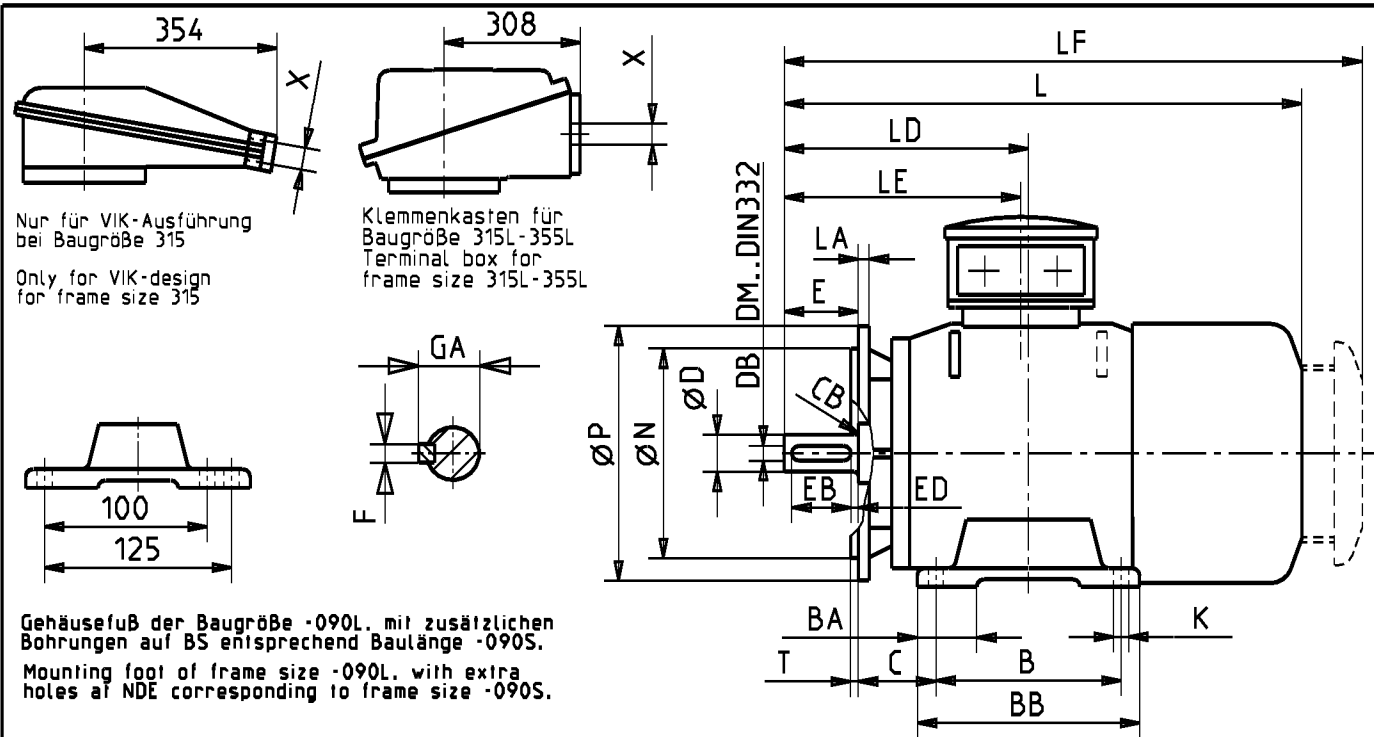
Plotstatus  
Print status

Letzter Änd.-Index  
Last change index

b

Format DIN A  
Size DIN A

3



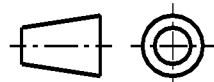
Flanschlage: Die Anschraublfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
 ① Lage der Flanschbohrungen ab Flansch- Ø P=450  
 ② Lage der Flanschbohrungen bis einschl. Flansch- Ø P=400  
 Passung bis N= Ø 250 ISO j6, ab N= Ø 300 ISO h6  
 Passfeder DIN 6885  
 Passung für Wellenende bis Ø 28 ISO j6, ab Ø 38 ISO k6, über Ø 50 ISO m6  
 Klemmenkasten um je 90° drehbar  
 Klemmenkasten wahlweise links von AS  
 Schutzdeckel nur bei Bauform IM V15 in Schutzart erhöhte Sicherheit EXe oder auf besondere Bestellung  
 Baugröße 90 ohne Tragöse  
 Bauformen IM V15, IM V36, ab Baugröße 100: 2 Tragösen gegenüberliegend

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
 ① position of flange-holes from flange-diameter P=450  
 ② position of flange-holes up to flange-diameter P=400  
 Fit up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
 Key to DIN 6885  
 Shaft end fit up to Ø 28 ISO j6, up to Ø 38 ISO k6, from Ø 50 ISO m6  
 Terminal box can be turned 90° in each direction  
 Terminal box optionally left hand side of DE  
 Protection hood only with mounting IM V15 in increased safety EXe or upon special request on order  
 Frame size 90 without eye bolt  
 Mountings IM V15, IM V36, from frame size 100: 2 eye bolt opposite

3) Typ / type: ANG. / ENG.  
 4) Typ / type: AMG. / EMG.  
 5) 315...02: alternativ geschweißt / alternatively welded  
 6) Abweichende Gewindegrößen nach Kunden-Auftrag / other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	AF	B	BA	BB	C	D	DB	E	EB	ED	CB	F	GA	H	HA	HD <sup>3)</sup>	HD <sup>4)</sup>	K	KA	L	LA	LD	LE	LF	M	N	P	S	T	X <sup>6)</sup>	Flansch wahlweise, flange optional					
																																				LA	M	N	P	S	T
132S.	2	216	50	260	270	297	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	16	364	364	12	18	503	12	239	239	561	265	230	300	14	4	2xM32x1.5	11	215	180	250	14	4
132M.	2	216	50	260	270	297	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	16	364	364	12	18	541	12	258	258	599	265	230	300	14	4	2xM32x1.5	11	215	180	250	14	4
160M.	2	254	60	310	310	293	210	60	256	108	42	M16	110	100	5	1	12	45	160	20	418	418	15	22	675	13	323	323	782	300	250	350	18	5	2xM40x1.5	11	215	180	250	14	4
160L.	2	254	60	310	310	293	254	60	300	108	42	M16	110	100	5	1	12	45	160	20	418	418	15	22	719	13	345	345	826	300	250	350	18	5	2xM40x1.5	12	265	230	300	14	4
180M.	2	279	70	345	341	334	241	80	300	121	48	M16	110	100	5	0.6	14	51.5	180	25	477	477	15	25	733	13	351.5	351.5	840	300	250	350	18	5	2xM40x1.5	12	265	230	300	14	4
180L.	2	279	70	345	341	334	279	80	338	121	48	M16	110	100	5	0.6	14	51.5	180	25	477	477	15	25	771	13	370.5	370.5	878	300	250	350	18	5	2xM40x1.5	16	400	350	450	18	5
200L.	2	318	80	400	392	365	305	90	365	133	55	M20	110	100	5	1.6	16	59	200	30	525	525	20	26	869	15	395.5	395.5	1046	350	300	400	18	5	2xM50x1.5	15	300	250	350	18	5
225S.	2	356	90	450	431	417	286	100	370	149	55	M20	110	100	5	1.6	16	59	225	32	578	578	20	26	889	16	402	402	1099	400	350	450	18	5	2xM50x1.5	15	350	300	400	18	5
225M.	2	356	90	450	431	417	311	100	395	149	55	M20	110	100	5	1.6	16	59	225	32	578	578	20	26	914	16	414.5	414.5	1124	400	350	450	18	5	2xM50x1.5	15	350	300	400	18	5
250M.	2	406	100	505	489	487	349	100	420	168	60	M20	140	125	7.5	1.6	18	64	250	35	654	654	25	36	1034	18	482.5	482.5	1274	500	450	550	18	5	2xM63x1.5						
280S.	2	457	110	570	550	609	368	120	470	190	65	M20	140	125	7.5	1.6	18	69	280	40	729	729	26	38	1069	18	514	514	1211	500	450	550	18	5	2xM63x1.5	18	400	350	450	18	5
280M.	2	457	110	570	550	609	419	120	520	190	65	M20	140	125	7.5	1.6	18	69	280	40	729	729	26	38	1120	18	539.5	539.5	1262	500	450	550	18	5	2xM63x1.5	18	400	350	450	18	5
315S.	2	508	120	630	622	644	406	130	520	216	65	M20	140	125	7.5	1.6	18	69	315	45	809	946	30	40	1240	22	559	559	1493	600	550	660	23	6	2xM63x1.5						
315M.	2	508	120	630	622	644	457	130	570	216	65	M20	140	125	7.5	1.6	18	69	315	45	809	946	30	40	1291	22	584.5	584.5	1544	600	550	660	23	6	2xM63x1.5						
315L.	2	508	120	630	622	644	508	130	621	216	65	M20	140	125	7.5	1.6	18	69	315	45	946	946	30	40	1417	22	610	584.5	1660	600	550	660	23	6	2xM63x1.5						
355M.	2	610	120	730	700	635	560	150	650	254	75	M20	140	125	7.5	1.6	20	79.5	355	50	968	968	30	40	1505	25	674	674	1695	740	680	800	24	6	2xM63x1.5						
355L.	2	610	120	730	700	635	630	150	720	254	75	M20	140	125	7.5	1.6	20	79.5	355	50	968	968	30	40	1575	25	709	709	1800	740	680	800	24	6	2xM63x1.5						

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Letzte Änderung  
Last change

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: A.G./E.G. 4JA.S./E.S., Geräusgüte 3, Noise grade 3  
Bauform/mounting: IM B35, IM V15, IM V36  
DIN 42673 und DIN 42677

Zeichnung-Nr.  
Drawing No.

**MLA00-0063**

Blatt  
Sheet

Sprache  
Language

de/en

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Bezeichnung  
Drawing title  
Maßblatt  
Dimension sheet

Plotdatum  
Print date

Plottersteller  
Printed by

für Abteilung  
for Department

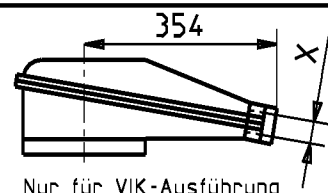
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Print status

Letzter Änd.-Index  
Last change index

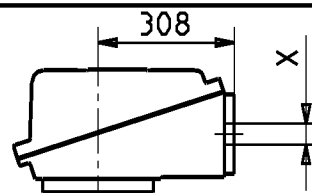
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Format DIN A  
Size DIN A

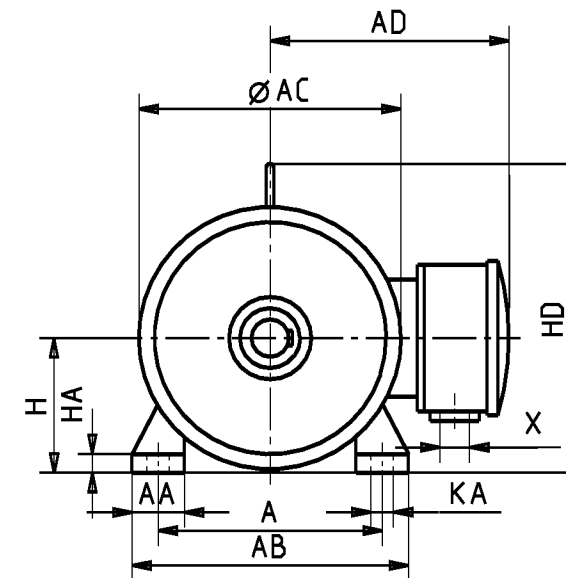
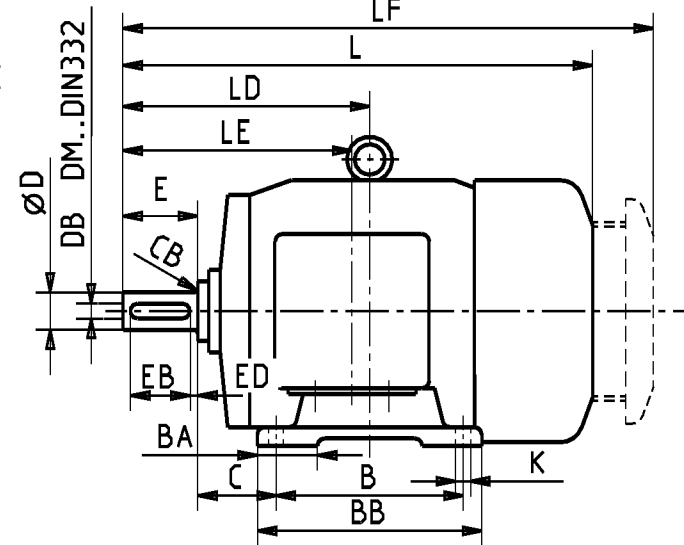
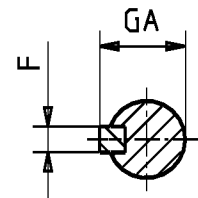
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Nur für VIK-Ausführung  
bei Baugröße 315-355  
Only for VIK-design  
for frame size 315-355



Klemmenkasten für  
Baugröße 315L-355L  
Terminal box for  
frame size 315L-355L



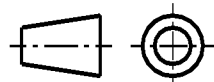
Paßfeder DIN 6885  
Toleranz für Wellenende bis  $\varnothing 28$  ISO j6,  
ab  $\varnothing 38$  ISO k6, über  $\varnothing 50$  ISO m6  
Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V5 in Schutzart  
erhöhte Sicherheit EExe oder auf besondere Bestellung  
Klemmenkasten wahlweise links von AS

Key to DIN 6885  
Shaft end tolerance up to  $\varnothing 28$  ISO j6  
up to  $\varnothing 38$  ISO k6, from  $\varnothing 50$  ISO m6  
Terminal box can be turned 90° in each direction  
Protection hood only with mounting Im V5 in increased  
safety EExe or upon special request on order  
Terminal box optionally left hand side of DE

- 1) Typ/Type: ANG./ENG.
- 2) Typ/Type: AMG./EMG.
- 3) 315...-02: alternativ geschweißt  
alternatively welded
- 4) Abweichende Gewindegrößen nach Kunden-Auftrag  
other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	AD <sup>1)</sup>	AD <sup>2)</sup>	B	BA	BB	C	D	DB	E	EB	ED	CB	F	GA	H	HA	HD	K	KA	L	LD	LE	LF	X <sup>4)</sup>
132S.	2	216	50	260	270	232	232	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	16	306	12	18	503	239	239	561	2xM32x1.5
132M.	2	216	50	260	270	232	232	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	16	306	12	18	541	258	258	599	2xM32x1.5
160M.	2	254	60	310	310	258	258	210	60	256	108	42	M16	110	100	5	1	12	45	160	20	356	15	22	675	323	323	782	2xM40x1.5
160L.	2	254	60	310	310	258	258	254	60	300	108	42	M16	110	100	5	1	12	45	160	20	356	15	22	719	345	345	826	2xM40x1.5
180M.	2	279	70	345	341	297	297	241	80	300	121	48	M16	110	100	5	0.6	14	51.5	180	25	402	15	25	733	351.5	351.5	840	2xM40x1.5
180L.	2	279	70	345	341	297	297	279	80	338	121	48	M16	110	100	5	0.6	14	51.5	180	25	402	15	25	771	370.5	370.5	878	2xM40x1.5
200L.	2	318	80	400	392	325	325	305	90	365	133	55	M20	110	100	5	1.6	16	59	200	30	455	20	26	869	395.5	395.5	1046	2xM50x1.5
225S.	2	356	90	450	431	353	353	286	100	370	149	55	M20	110	100	5	1.6	16	59	225	32	501	20	26	889	402	402	1099	2xM50x1.5
225M.	2	356	90	450	431	353	353	311	100	395	149	55	M20	110	100	5	1.6	16	59	225	32	501	20	26	914	414.5	414.5	1124	2xM50x1.5
250M.	2	406	100	505	489	404	404	349	100	420	168	60	M20	140	125	7.5	1.6	18	64	250	35	563	25	36	1034	482.5	482.5	1274	2xM63x1.5
280S.	2	457	110	570	550	449	449	368	120	470	190	65	M20	140	125	7.5	1.6	18	69	280	40	643	26	38	1069	514	514	1211	2xM63x1.5
280M.	2	457	110	570	550	449	449	419	120	520	190	65	M20	140	125	7.5	1.6	18	69	280	40	643	26	38	1120	539.5	539.5	1262	2xM63x1.5
315S.	2	508	120	630	622	494	631	406	130	520	216	65	M20	140	125	7.5	1.6	18	69	315	45	713	30	40	1240	559	559	1493	2xM63x1.5
315M.	2	508	120	630	622	494	631	457	130	570	216	65	M20	140	125	7.5	1.6	18	69	315	45	713	30	40	1291	584.5	584.5	1544	2xM63x1.5
315L.	2	508	120	630	622	564	564	508	130	621	216	65	M20	140	125	7.5	1.6	18	69	315	45	713	30	40	1417	610	584.5	--	2xM63x1.5
355M.	2	610	120	730	700	640	640	560	150	650	254	75	M20	140	125	7.5	1.6	20	79.5	355	50	819	30	40	1505	674	674	--	2xM63x1.5
355L.	2	610	120	730	700	640	640	630	150	720	254	75	M20	140	125	7.5	1.6	20	79.5	355	50	819	30	40	1575	709	709	--	2xM63x1.5

**FLENDER  
LOHER**



Änderungen nur im  
CAD-E vornehmen.

Erstellt  
Compiled

Letzte Änderung  
Last change

Datum  
Date

Name  
Name

Datum  
Date

Name  
Name

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: A.G./E.G. 3) A.S./E.S. , Geräuschgüte/Noise grade3  
Bauform/mounting: IM B3, IM V5, IM V6 DIN 42673

Zeichnung-Nr.  
Drawing No.

**MLA00-0067**

Blatt  
Sheet

Sprache  
Language

de/en

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This technical document  
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Bearbeitet, Designed  
Geprüft, Checked  
Teileklasse  
Classification 20501

Bezeichnung  
Drawing title  
**Maßblatt  
Dimension sheet**

Plotdatum  
Print date

Plotersteller  
Printed by

für Abteilung  
for Department

Plotstatus  
Print status

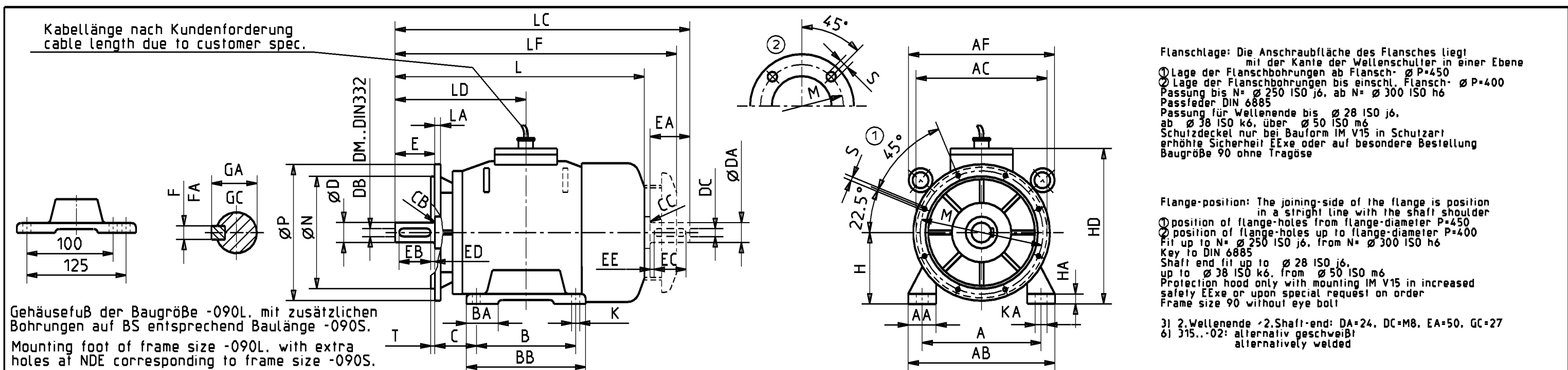
Letzter Änd.-Index  
Last change index

a

Format DIN A  
Size DIN A

3





Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	AF	B	BA	BB	C	D	DB	E	EB	ED	CB	F	GA	H	HA	HD	K	KA	L	LA	LC	LD	LF	M	N	P	S	T	Flansch wahlweise, flange optional					
		A	AA	AB	AC	AF	B	BA	BB	C	DA	DC	EA	EC	EE	CC	FA	GC	H	HA	HD	K	KA	L	LA	LC	LD	LF	M	N	P	S	T	LA	M	N	P	S	T
090L	2-8	140	40	180	186	-	125	62	155	56	24	M8	50	40	5	0.4	8	27	90	13	184	10.5	12	324.5	10	380.5	168.5	361.5	165	130	200	11.5	3.5	11	215	180	250	14	4
100L	2-8	160	45	205	206	213	140	45	170	63	28	M10	60	50	5	0.6	8	31	100	15	203	12	18	382.5	11	443	193	423	215	180	250	14	4	-	-	-	-	-	-
112M	2-8	190	45	230	229	211	140	45	176	70	28	M10	60	50	5	0.6	8	31	112	16	231	12	18	389	10	453	200	435	215	180	250	14	4	13	265	230	300	14	4
132S	2-8	216	50	260	270	297	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	16	274	12	18	458	12	556	239	516	265	230	300	14	4	11	215	180	250	14	4
132M	2-8	216	50	260	270	297	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	16	274	12	18	496	12	594	258	554	265	230	300	14	4	11	215	180	250	14	4
160M	2 4-8	254	60	310	310	293	210	60	256	108	42	M16	110	100	5	1	12	45	160	20	328	15	22	628 580	13	756	323	735 619	300	250	350	18	5	11 12	215 265	180 230	250 300	14 14	4 4
160L	2 4-8	254	60	310	310	293	254	60	300	108	42	M16	110	100	5	1	12	45	160	20	328	15	22	672 624	13	800	345	779 663	300	250	350	18	5	11 12	215 265	180 230	250 300	14 14	4 4
180M	2 4-8	279	70	345	341	334	241	80	300	121	48	M16	110	100	5	0.6	14	51.5	180	25	364	15	25	696 646	13	832	351.5	802.5 690.5	300	250	350	18	5	12 16	265 400	230 350	300 450	14 18	4 5
180L	2 4-8	279	70	345	341	334	279	80	338	121	48	M16	110	100	5	0.6	14	51.5	180	25	364	15	25	734 684	13	870	370.5	840.5 728.5	300	250	350	18	5	12 16	265 400	230 350	300 450	14 18	4 5
200L	2 4-8	318	80	400	392	365	305	90	365	133	55	M20	110	100	5	1.6	16	59	200	30	412	20	26	766	15	916	395.5	840.5	350	300	400	18	5	15 16	300 400	250 350	350 450	18 18	5 5
225S	2 4-8	356	90	450	431	417	286	100	370	149	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	225	32	465	20	26	788 818	16	938 998	402 432	872 902	400	350	450	18	5	15	350	300	400	18	5
225M	2 4-8	356	90	450	431	417	311	100	395	149	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	225	32	465	20	26	813 843	16	963 1023	414.5 444.5	896.5 926.5	400	350	450	18	5	15	350	300	400	18	5
250M	2 4-8	406	100	505	489	487	349	100	420	168	60 65	M20	140	125	7.5	1.6	18	64 69	250	35	529	25	36	937	18	1110	482.5	1037.5	500	450	550	18	5						
280S	2 4-8	457	110	570	550	609	368	120	470	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	593	26	38	1004	18	1184	514	1116	500	450	550	18	5	18	400	350	450	18	5
280M	2 4-8	457	110	570	550	609	419	120	520	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	593	26	38	1055	18	1235	539.5	1166.5	500	450	550	18	5	18	400	350	450	18	5
315S	2 4-8	508	120	630	622	644	406	130	520	216	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	673	30	40	1110 1200	22	1347 1420	559 589	1273 1310	600	550	660	23	6						
315M	2 4-8	508	120	630	622	644	457	130	570	216	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	673	30	40	1161 1251	22	1398 1471	584.5 614.5	1324 1361.5	600	550	660	23	6						

Maß EB,ED,CB nachgetragen

Änderungs-Bemerkung  
Description of change

FLENDER  
LOHER

Erstellt  
Compiled

Datum  
Date

Name  
Name

Letzte Änderung  
Last change

Datum  
Date

Name  
Name

Drehstrommotor mit Käfigläufer  
Three-phase-motor with squirrel cage-rotor  
Typ/type: A.G./E.G. 6) A.S./E.S.  
Bauform/mounting: IM B35, IM V15, IM V36  
DIN 42673 u. DIN 42677

Zeichnung-Nr.  
Drawing No.

MLA00-0093

Blatt  
Sheet

Sprache  
Language

de/en

Änd.-Index  
Change index

a

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Bearbeitet, Designed

06.11.03

IAT8 LI

04.12.03

IMT26KA

Geprüft, Checked

06.11.03

IAT

04.12.03

IMT

Teileklasse  
Classification

20501

Bezeichnung  
Drawing title

Maßblatt  
Dimension sheet

Plotdatum  
Print date

Plottersteller  
Printed by

für Abteilung  
for Department

Plotstatus  
Print status

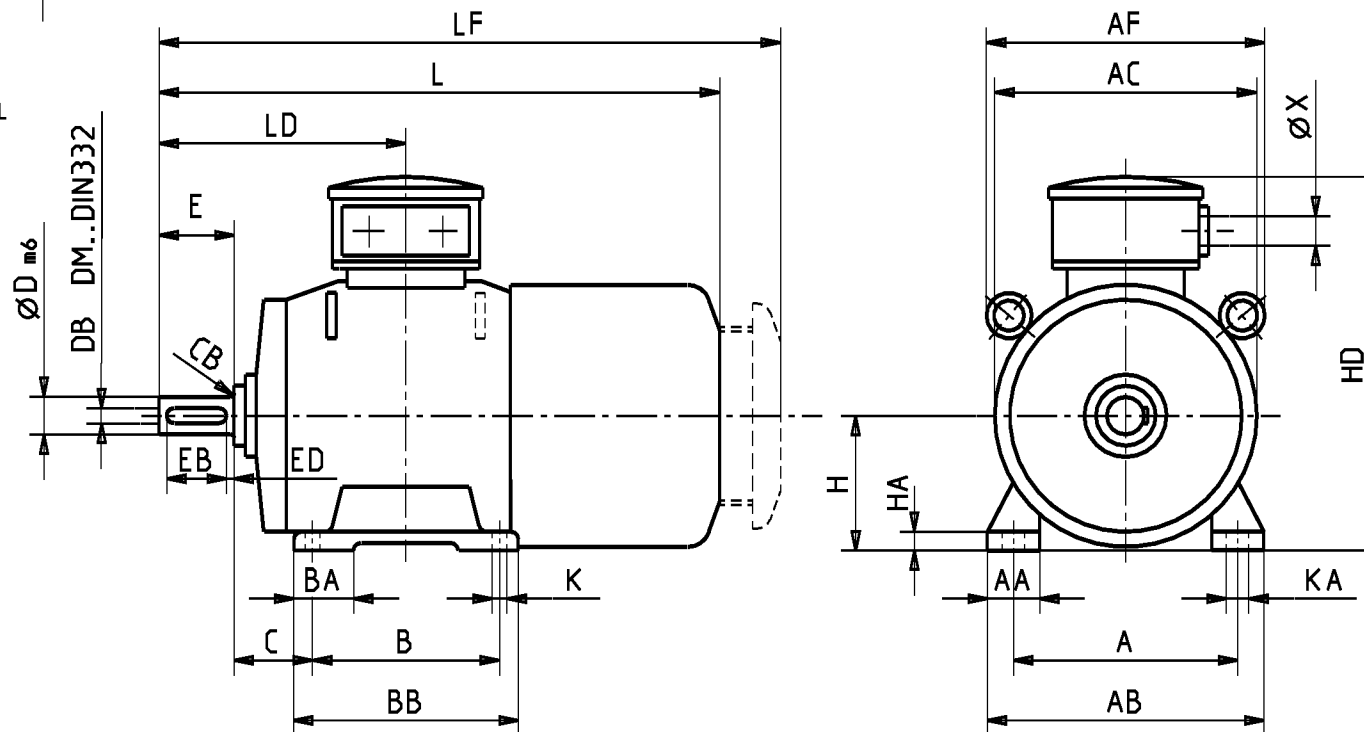
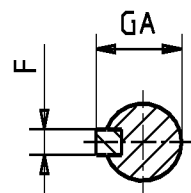
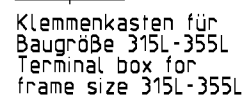
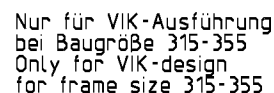
Letzter Änd.-Index  
Last change index

a

Format DIN A  
Size DIN A

3

1 2 3 4 5 6 7 8



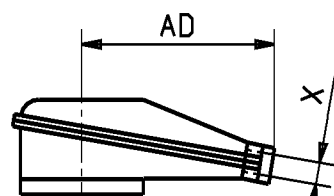
Paßfeder DIN 6885  
Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V5  
auf besondere Bestellung  
1) Typ ANLA  
2) Typ AMLA  
3) 315...-02: alternativ geschweißt  
4) Abweichende Gewindegrößen nach Kunden-Auftrag

Key to DIN 6885  
Terminal box can be turned 90° in each direction  
Protection hood only with mounting Im V5  
upon special request on order

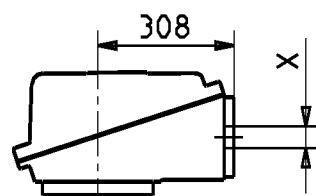
- 1) Type ANLA
- 2) Type AMLA
- 3) 315...02: alternatively welded
- 4) other thread sizes acc. customer order

[illegible]

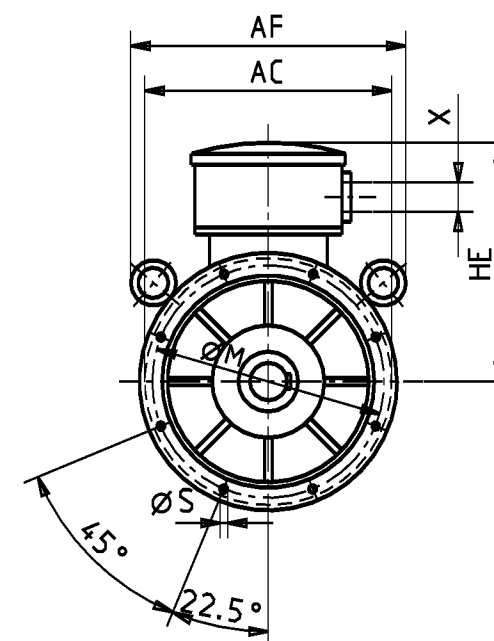
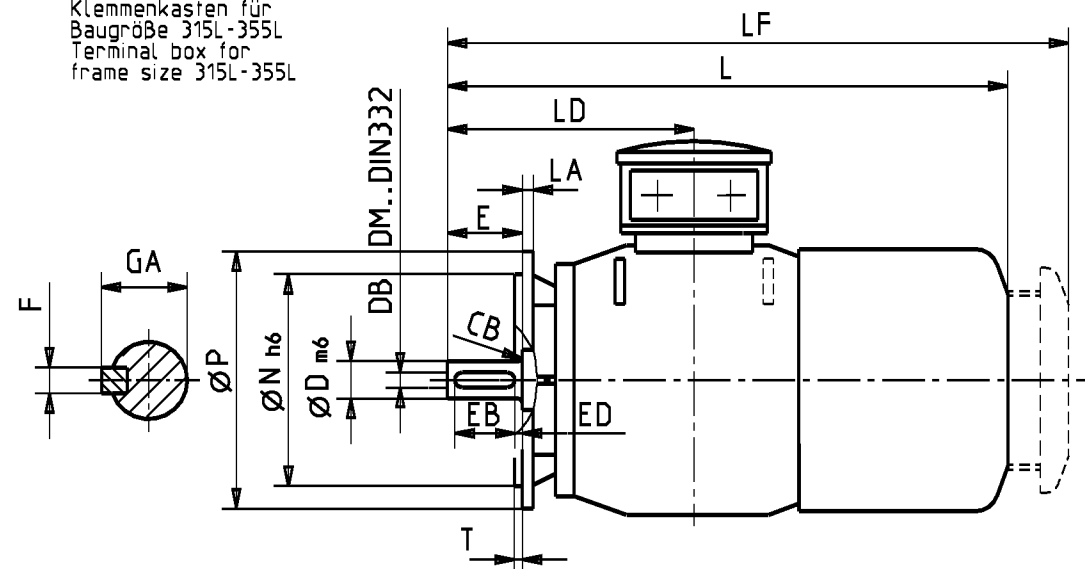




Nur für VIK-Ausführung  
bei Baugröße 315  
Only for VIK-design  
for frame size 315



Klemmenkasten für  
Baugröße 315L-355L  
Terminal box for  
frame size 315L-355L



Flanschlage : Die Anschraubfläche des Flansches liegt  
mit der Kante der Wellenschulter in einer Ebene  
Paßfeder DIN 6885  
Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V15  
auf besondere Bestellung

- 1) Typ ANLA
- 2) Typ AMLA
- 3) 315...-02: alternativ geschweißt
- 4) Abweichende Gewindegrößen nach Kunden-Auftrag

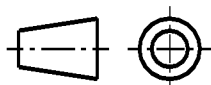
Flange-position: The joining-side of the flange is position  
in a straight line with the shaft shoulder

Key to DIN 6885  
Terminal box can be turned 90° in each direction  
Protection hood only with mounting Im V15  
upon special request on order

- 1) Type ANLA
- 2) Type AMLA
- 3) 315...-02: alternatively welded
- 4) other thread sizes acc. customer order

Typ type	Polzahl number of poles	AC	AD <sup>4)</sup>	AF	D	DB	E	EB	ED	CB	F	GA	H	HA	HD <sup>1)</sup>	HD <sup>2)</sup>	K	KA	L	LD	LF	M	N	P	S	T					X <sup>4)</sup>
A.L.-315S.	2 4-8	622	354	644	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	809	935	30	40	1286 1316	559 589	1449 1479	600	550	660	23	6					2xM63x1.5
A.L.-315M.	2 4-8	622	354	644	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	809	935	30	40	1337 1367	584.5 614.5	1500 1530	600	550	660	23	6					2xM63x1.5
A.L.-315L.	2 4-8	622	354	644	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	996	996	30	40	1457 1547	610 640	-	600	550	660	23	6					2xM63x1.5
A.L.-355M.	2 4-8	700	354	635	75 90	M20 M24	140 170	125 140	7.5 15	1.6 2.5	20 25	79.5 95	355	50	1084	1084	30	40	1554 1584	674 704	-	740	680	800	24	6					2xM63x1.5
A.L.-355L.	2 4-8	700	354	635	75 90	M20 M24	140 170	125 140	7.5 15	1.6 2.5	20 25	79.5 95	355	50	1084	1084	30	40	1624 1654	709 739	-	740	680	800	24	6					2xM63x1.5

FLENDER  
LOHER



Erstellt  
Compiled

Letzte Änderung  
Last change

Datum  
Date

Name  
Name

Datum  
Date

Name  
Name

Drehstrommotoren mit Käfigläufer u. Fremdbelüftung  
Three-phase motors with squirrel cage-rotor a. forced vent.  
Typ/type: A.L. 3) A.U.  
Bauform/mounting: IM B5, IM V1, IM V3 DIN 42677

Zeichnung-Nr.  
Drawing No.

MLA00-0104

Blatt  
Sheet

Sprache  
Language

de/en

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Geprüft, Checked  
Teileklasse  
Classification 20501

Bezeichnung  
Drawing title Maßblatt  
Dimension sheet

Plotdatum  
Print date

Plotersteller  
Printed by

für Abteilung  
for Department

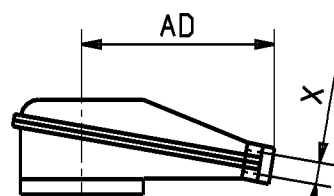
Plotstatus  
Print status

Letzter Änd.-Index  
Last change index

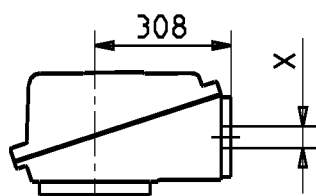
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Format DIN A  
Size DIN A

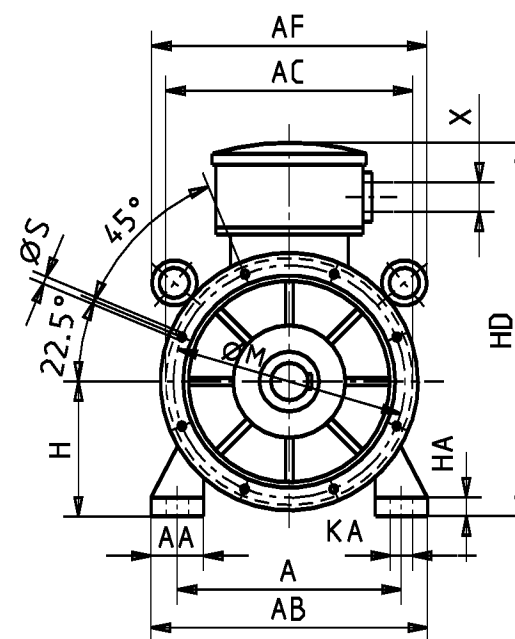
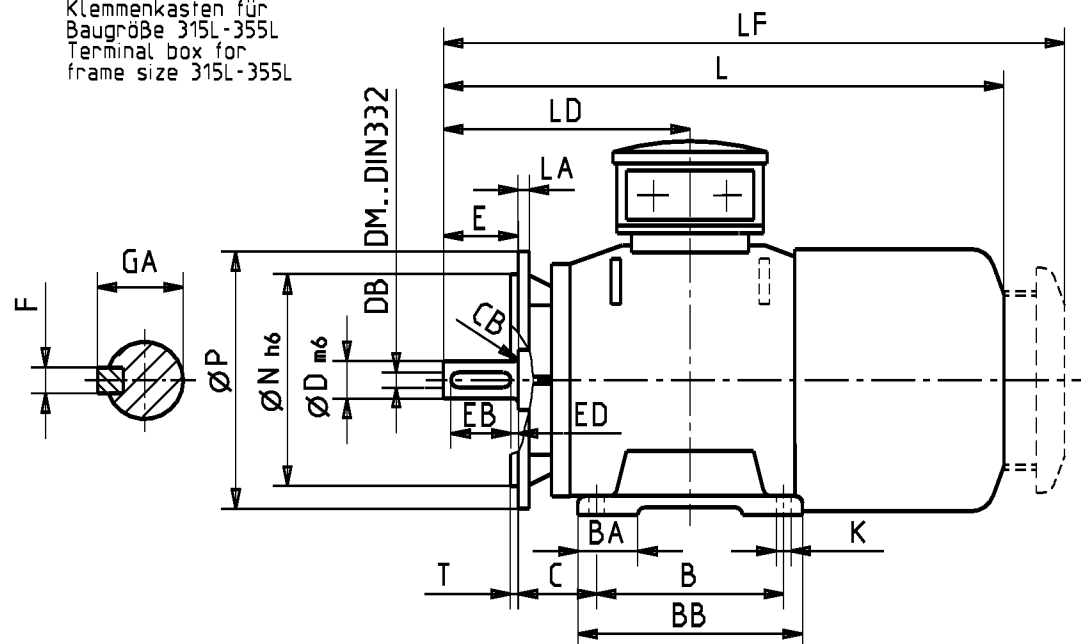
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Nur für VIK-Ausführung  
bei Baugröße 315  
Only for VIK-design  
for frame size 315



Klemmenkasten für  
Baugröße 315L-355L  
Terminal box for  
frame size 315L-355L



Flanschlage : Die Anschraubfläche des Flansches liegt  
mit der Kante der Wellenschulter in einer Ebene  
Paßfeder DIN 6885  
Klemmenkasten um je 90° drehbar  
Schutzdeckel nur bei Bauform IM V15  
auf besondere Bestellung

- 1) Typ ANLA
- 2) Typ AMLA
- 3) 315...-02: alternativ geschweißt
- 4) Abweichende Gewindegrößen nach Kunden-Auftrag

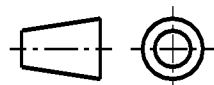
Flange-position: The joining-side of the flange is position  
in a straight line with the shaft shoulder

Key to DIN 6885  
Terminal box can be turned 90° in each direction  
Protection hood only with mounting Im V15  
upon special request on order

- 1) Type ANLA
- 2) Type AMLA
- 3) 315...-02: alternatively welded
- 4) other thread sizes acc. customer order

Typ type	Polzahl number of poles	A	AA	AB	AC	AD <sup>4)</sup>	AF	B	BA	BB	C	D	DB	E	EB	ED	CB	F	GA	H	HA	HD <sup>1)</sup>	HD <sup>2)</sup>	K	KA	L	LD	LF	M	N	P	S	T	X <sup>4)</sup>
A.L.-315S.	2 4-8	508	120	630	622	354	644	406	130	520	216	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	809	935	30	40	1286 1316	559 589	1449 1479	600	550	660	23	6	2xM63x1.5
A.L.-315M.	2 4-8	508	120	630	622	354	644	457	130	570	216	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	809	935	30	40	1337 1367	584.5 614.5	1500 1530	600	550	660	23	6	2xM63x1.5
A.L.-315L.	2 4-8	508	120	630	622	354	644	508	130	621	216	65 80	M20	140 170	125 140	7.5 15	1.6	18 22	69 85	315	45	996	996	30	40	1457 1547	610 640	-	600	550	660	23	6	2xM63x1.5
A.L.-355M.	2 4-8	610	120	730	700	354	635	560	150	650	254	75 90	M20 M24	140 170	125 140	7.5 15	1.6 2.5	20 25	79.5 95	355	50	1084	1084	30	40	1554 1584	674 704	-	740	680	800	24	6	2xM63x1.5
A.L.-355L.	2 4-8	610	120	730	700	354	635	630	150	720	254	75 90	M20 M24	140 170	125 140	7.5 15	1.6 2.5	20 25	79.5 95	355	50	1084	1084	30	40	1624 1654	709 739	-	740	680	800	24	6	2xM63x1.5

FLENDER  
LOHER



Erstellt  
Compiled

Letzte Änderung  
Last change

Datum  
Date

Name  
Name

Datum  
Date

Name  
Name

Drehstrommotoren mit Käfigläufer u. Fremdbelüftung  
Three-phase motors with squirrel cage-rotor a. forced vent.  
Typ/type: A.L. 3) A.U.  
Bauform/mounting: IM B35, IM V15, IM V36 DIN 42673 u. DIN 42677

Zeichnung-Nr.  
Drawing No.

MLA00-0105

Blatt  
Sheet

Sprache  
Language

de/en

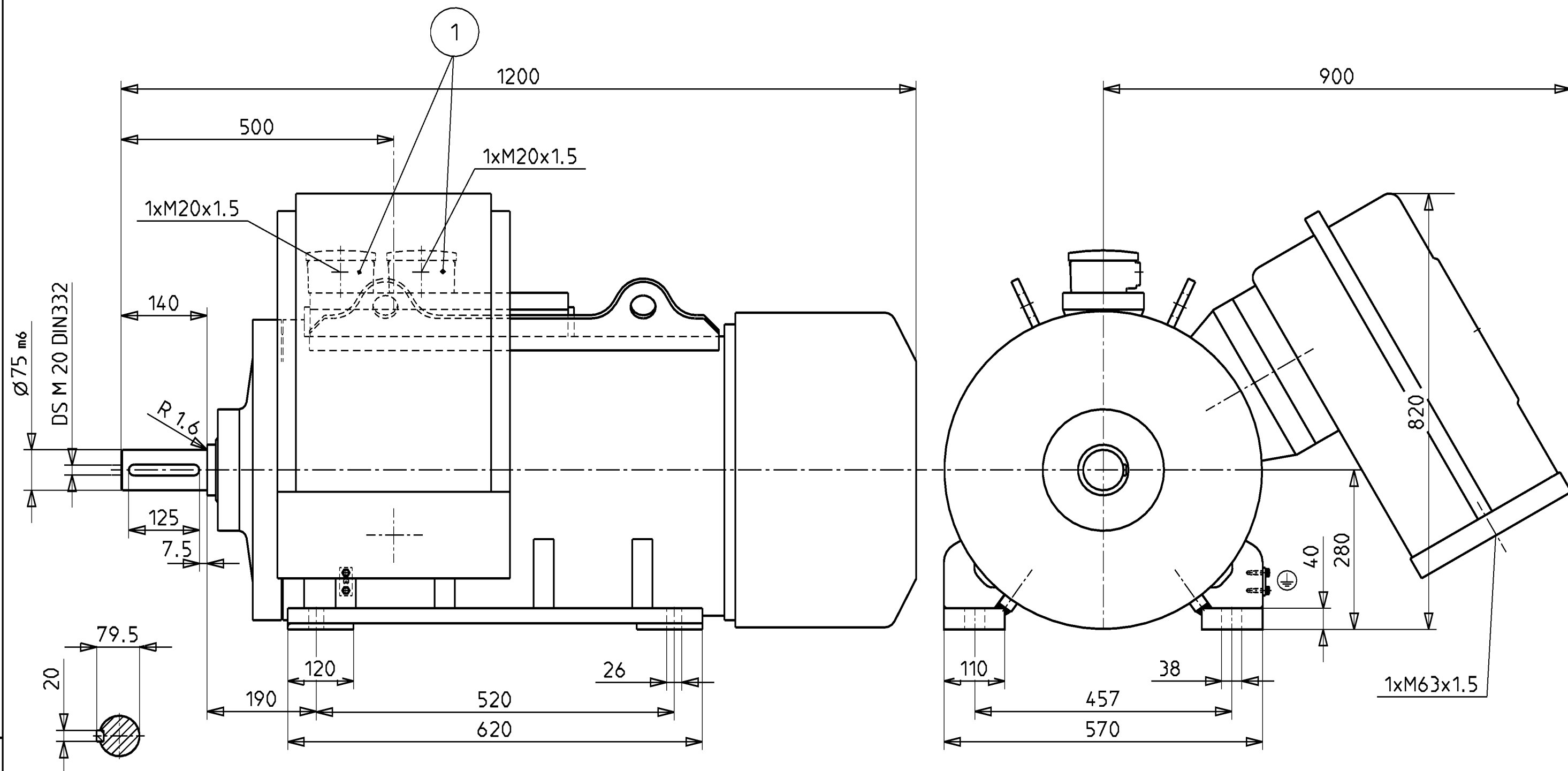
Letzter Änd.-Index  
Last change index

b

Format DIN A  
Size DIN A

3

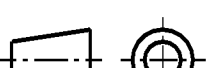


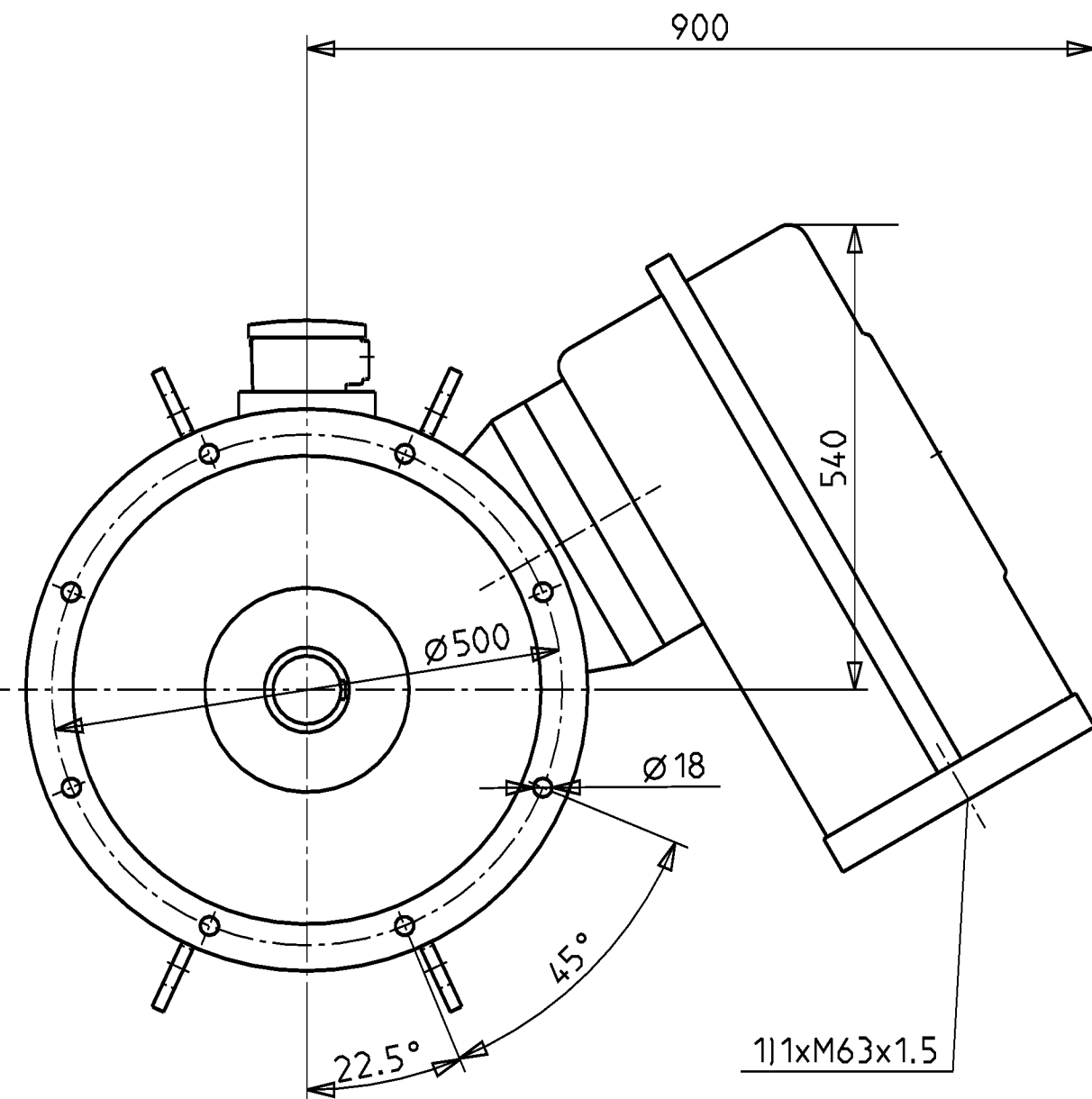
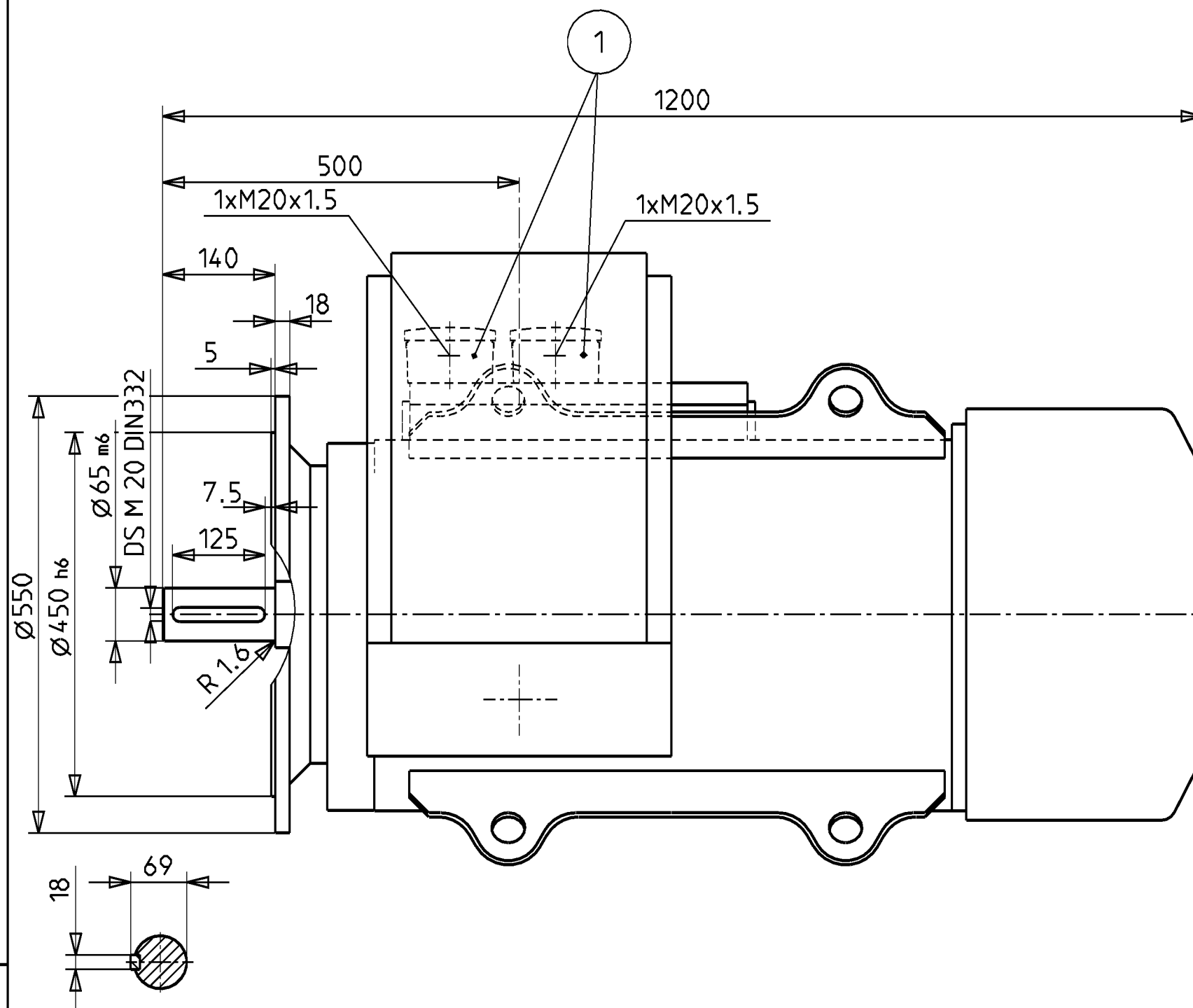


Paßfeder DIN 6885  
Key to DIN 6885

① wahlweise Anschlußkasten für  
thermische Überwachung und Stillstandsheizung  
optionally terminal box for  
thermal monitoring and space heater

AS-WE: Maß R1.6, 125, 7.5 nachgetragen	Änderungs-Bemerkung Description of change
a	Änd.-Index Change index


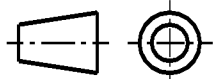
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Änderungen nur im CAD-E vornehmen.		Datum Date	Name Name	Datum Date	Name Name										
Diese technische Unterlage hat gesetzlichen Schutz (DIN34).  This technical document is proprietary (DIN34).	Bearbeitet. Designed	18.10.02	IMT27SU	04.12.03	IMT26KA	Plotdatum Print date	Plotersteller Printed by	für Abteilung for Department	Plotstatus Print status			Letzter Änd.-Index Last change index  a	Format DIN A Size DIN A  3		
	Geprüft. Checked	18.10.02	IMT2HK	04.12.03	IMT										
	Teileklasse Classification	20501	Bezeichnung Drawing title Maßblatt Dimension sheet												

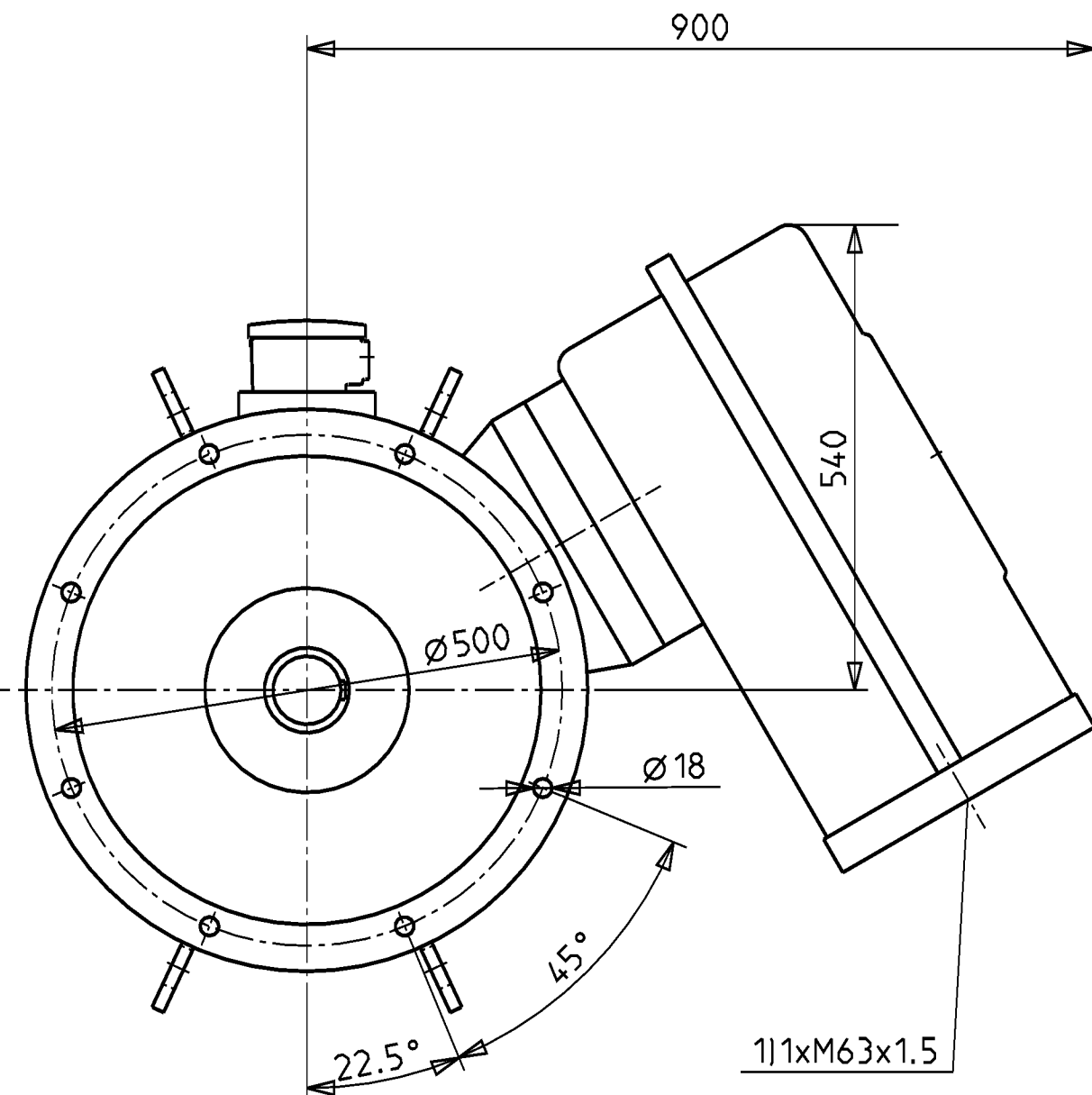
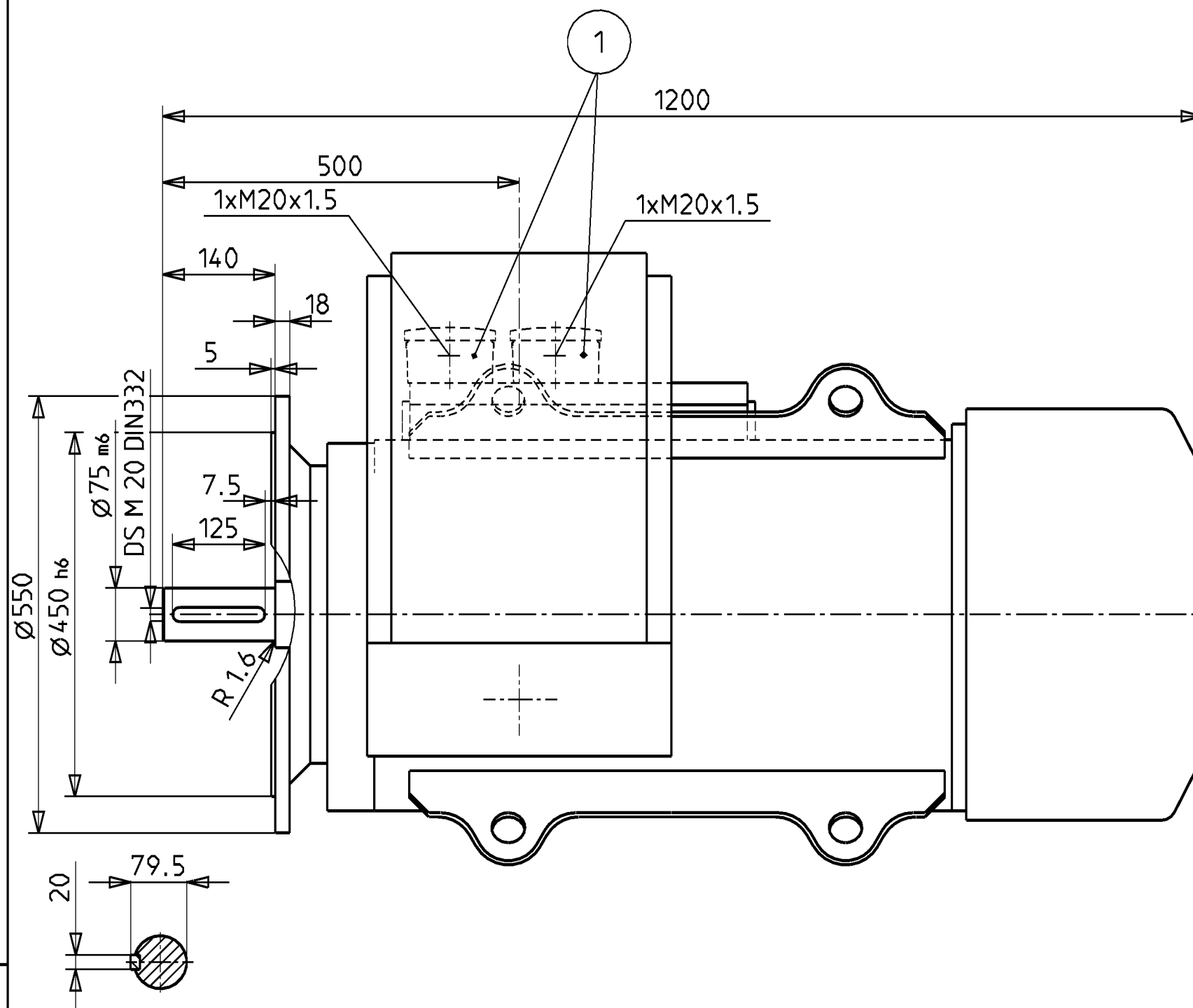


Paßfeder DIN 6885  
Key to DIN 6885

1 wahlweise Anschlußkasten für  
thermische Überwachung und Stillstandsheizung  
optionally terminal box for  
thermal monitoring and space heater

1) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

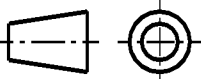
			Änderungs-Bemerkung Description of change	<div></div> <div>Paßfeder DIN 6885 Key to DIN 6885</div> <div><div>1</div><div>wahlweise Anschlußkasten für thermische Überwachung und Stillstandsheizung optionally terminal box for thermal monitoring and space heater</div></div> <div>1) Abweichende Gewindegrößen nach Kunden-Auftrag Other thread sizes acc. customer order</div>									
				<div><div><div>FLENDER LOHER</div><div>Änderungen nur im CAD-E vornehmen.</div></div><div></div></div>	<div><div>Erstellt Compiled</div><div>Datum Date</div><div>Name Name</div></div> <div><div>Letzte Änderung Last change</div><div>Datum Date</div><div>Name Name</div></div>	<div>Drehstrommotor Three-phase-motor Typ/type: AJS.-280L.-02 Bauform/mounting: IM V1, IM B5</div>				<div>Zeichnung-Nr. Drawing No.</div> <div>MLA28-1008</div>	<div>Blatt Sheet</div>	<div>Sprache Language</div> <div>de/en</div>	
				<div>Diese technische Unterlage hat gesetzlichen Schutz (DIN34).</div> <div>This technical document is proprietary (DIN34).</div>	<div>Bearbeitet, Designed</div> <div>Geprüft, Checked</div> <div>Teileklasse Classification</div> <div>20501</div>	<div>15.05.03</div> <div>15.05.03</div>	<div>IMT28BA</div>	<div>Plotdatum Print date</div>	<div>Plotersteller Printed by</div>	<div>für Abteilung for Department</div>	<div>Plotstatus Print status</div>	<div>Letzter Änd.-Index Last change index</div>	<div>Format DIN A Size DIN A</div> <div>3</div>
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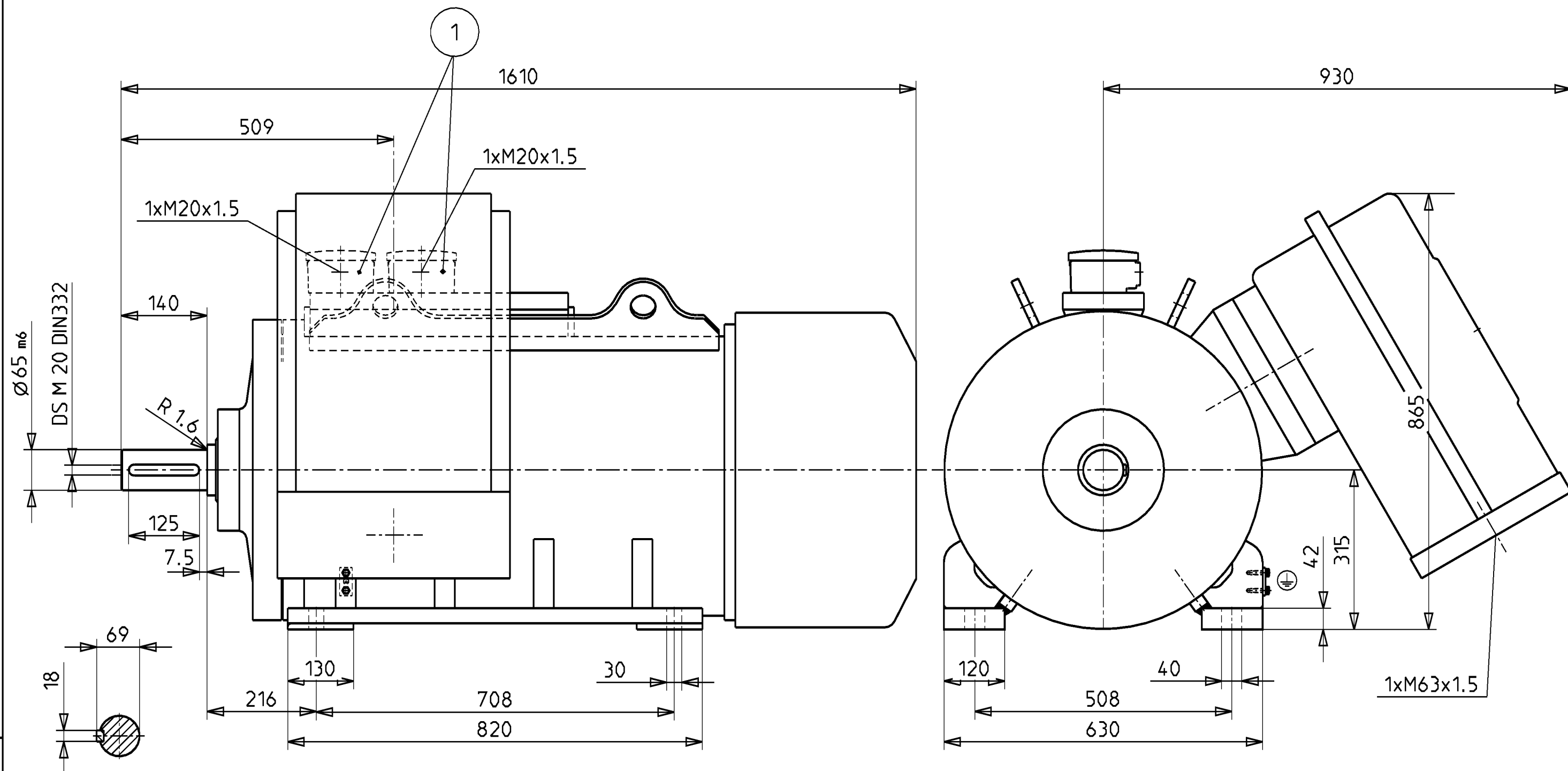


Paßfeder DIN 6885  
Key to DIN 6885

1 wahlweise Anschlußkasten für  
thermische Überwachung und Stillstandsheizung  
optionally terminal box for  
thermal monitoring and space heater

1) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

Änderungs-Bemerkung Description of change		Paßfeder DIN 6885 Key to DIN 6885		① wahlweise Anschlußkasten für thermische Überwachung und Stillstandsheizung optionally terminal box for thermal monitoring and space heater		1) Abweichende Gewindegrößen nach Kunden-Auftrag Other thread sizes acc. customer order													
		FLENDER LOHER				Erstellt Compiled		Letzte Änderung Last change		Drehstrommotor Three-phase-motor Typ/type: AJS.-280L.-04 Bauform/mounting: IM V1, IM B5				Zeichnung-Nr. Drawing No. MLA28-1009		Blatt Sheet		Sprache Language de/en	
		Änderungen nur im CAD-E vornehmen.				Datum Date		Name Name		Datum Date		Name Name							
		Diese technische Unterlage hat gesetzlichen Schutz (DIN34).  This technical document is proprietary (DIN34).		Bearbeitet, Designed		19.05.03		IMT28BA											
Änd.-Index Change index		Geprüft, Checked		19.05.03												Letzter Änd.-Index Last change index		Format DIN A Size DIN A	
		Teileklasse Classification		20501		Bezeichnung Drawing title		Maßblatt Dimension sheet		Plotdatum Print date		Plottersteller Printed by		für Abteilung for Department		Plotstatus Print status		3	
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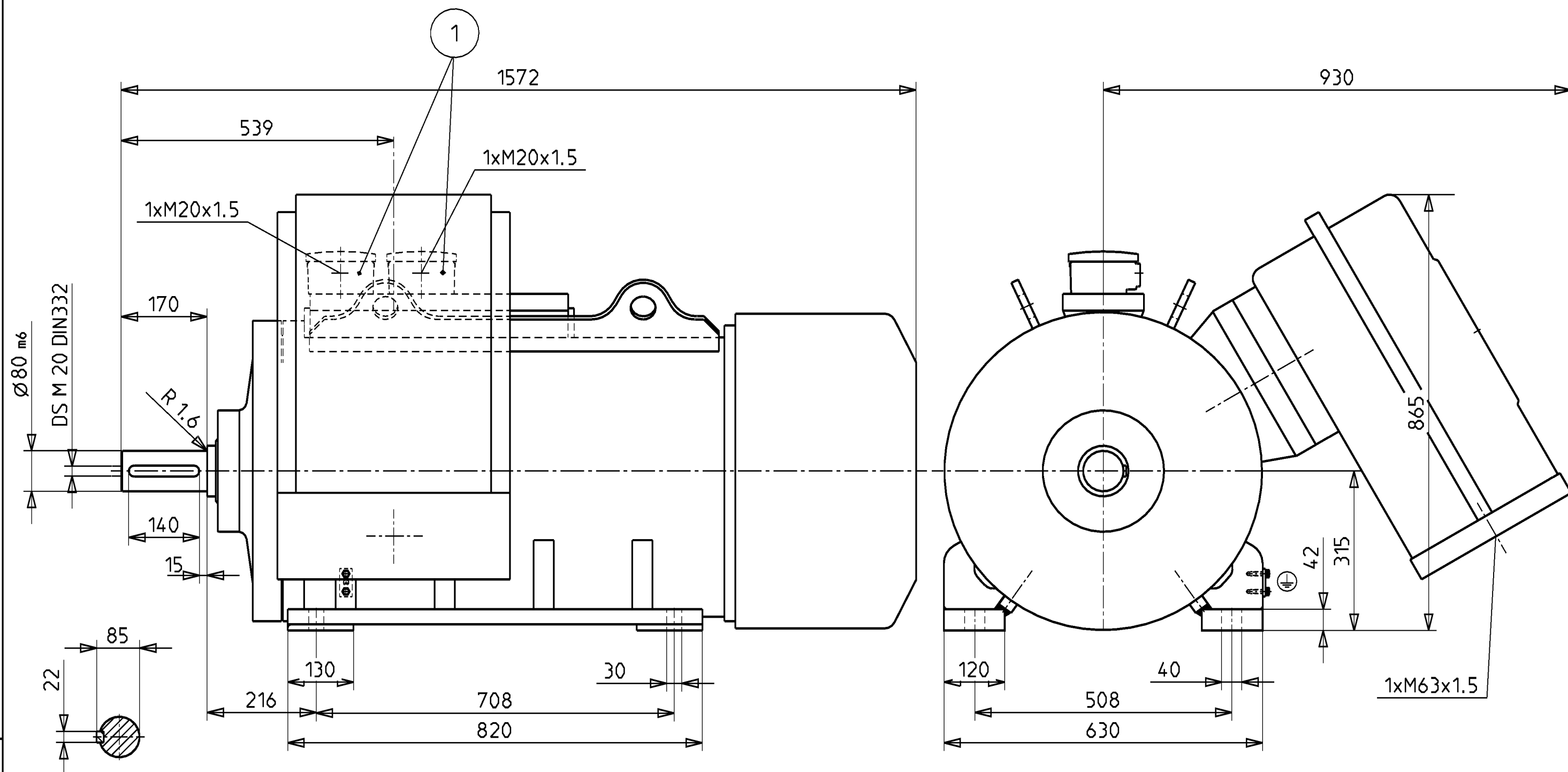
Paßfeder DIN 6885  
Key to DIN 6885

Geräuschgüte 3  
Noise class 3

① wahlweise Anschlußkasten für  
thermische Überwachung und Stillstandsheizung  
optionally terminal box for  
thermal monitoring and space heater

AS-WE: Maß R1.6, 125, 7.5 nachgetragen	Änderungs-Bemerkung Description of change
a	Änd.-Index Change index

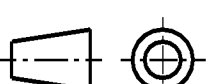
<b>FLENDER LOHER</b> <small>Änderungen nur im CAD-E vornehmen.</small>		Erstellt Compiled		Letzte Änderung Last change		Drehstrommotor Three-phase-motor Typ/type: AJS.-315L.-02 Bauform/mounting: IM B3				Zeichnung-Nr. Drawing No. <b>MLA31-1002</b>	Blatt Sheet	Sprache Language de/en
		Datum Date	Name Name	Datum Date	Name Name							
Diese technische Unterlage hat gesetzlichen Schutz (DIN34).  This technical document is proprietary (DIN34).	Bearbeitet, Designed	18.10.02	IMT27SU	04.12.03	IMT26KA	Plotdatum Print date	Plotersteller Printed by	für Abteilung for Department	Plotstatus Print status		Letzter Änd.-Index Last change index <b>a</b>	Format DIN A Size DIN A <b>3</b>
	Geprüft, Checked	18.10.02	IMT2HK	04.12.03	IMT							
	Teileklasse Classification <b>20501</b>	Bezeichnung Drawing title <b>Maßblatt Dimension sheet</b>										



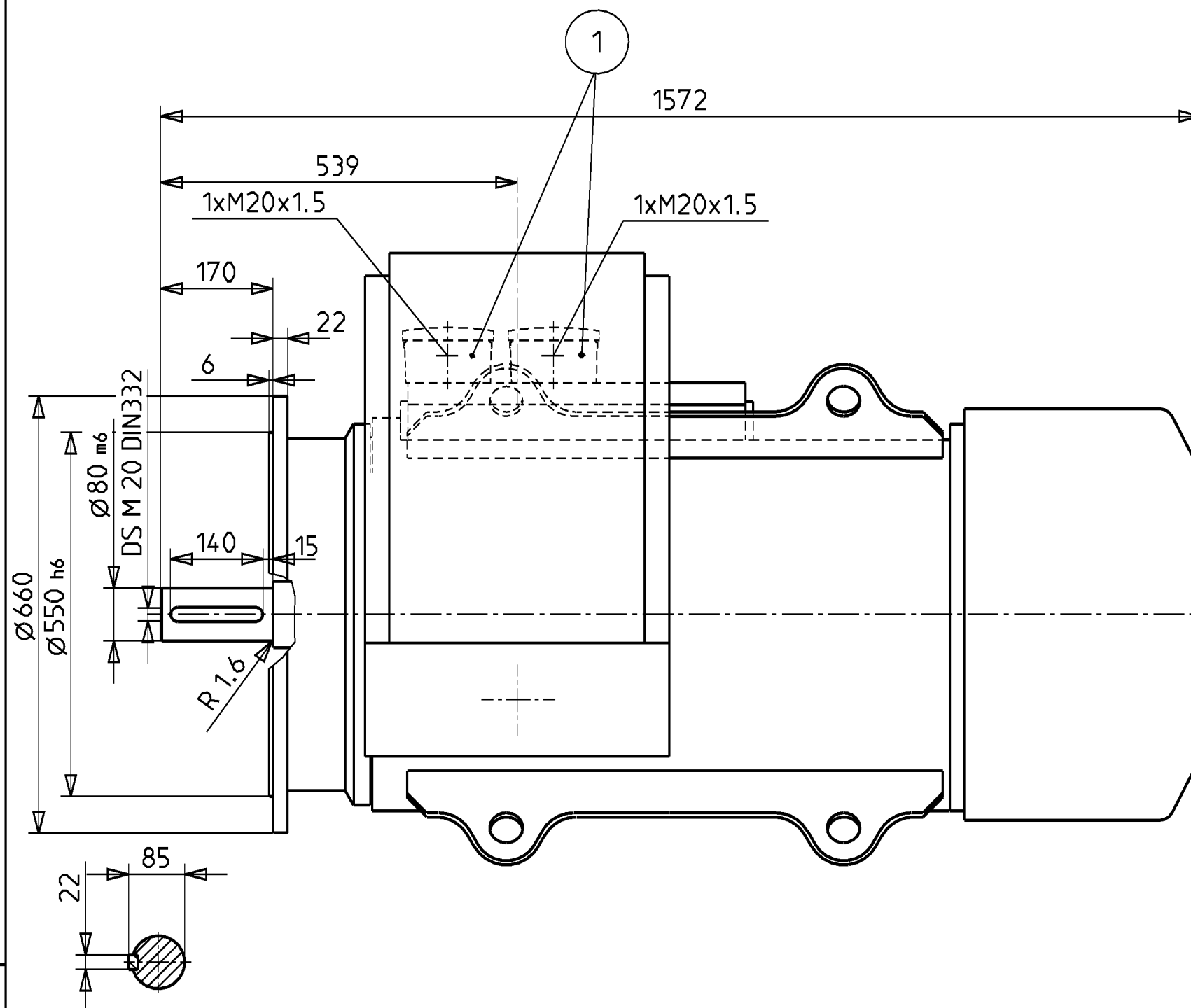
Paßfeder DIN 6885  
Key to DIN 6885

1 wahlweise Anschlußkasten für  
thermische Überwachung und Stillstandsheizung  
optionally terminal box for  
thermal monitoring and space heater

AS-WE: Maß R1.6, 140, 15 nachgetragen
Änderungs-Bemerkung Description of change
Änd.-Index Change index
a

<b>FLENDER LOHER</b>		Erstellt Compiled		Letzte Änderung Last change		Drehstrommotor Three-phase-motor Typ/type: AJS.-315L.-04 Bauform/mounting: IM B3				Zeichnung-Nr. Drawing No. <b>MLA31-1003</b>	Blatt Sheet	Sprache Language  de/en
Änderungen nur im CAD-E vornehmen.		Datum Date	Name Name	Datum Date	Name Name							
Diese technische Unterlage hat gesetzlichen Schutz (DIN34).  This technical document is proprietary (DIN34).	Bearbeitet, Designed	18.10.02	IMT27SU	04.12.03	IMT26KA	Plotdatum Print date	Plotersteller Printed by	für Abteilung for Department	Plotstatus Print status	Letzter Änd.-Index Last change index  a	Format DIN A Size DIN A  3	
	Geprüft, Checked	18.10.02	IMT2HK	04.12.03	IMT							
	Teileklasse Classification	20501	Bezeichnung Drawing title Maßblatt Dimension sheet									





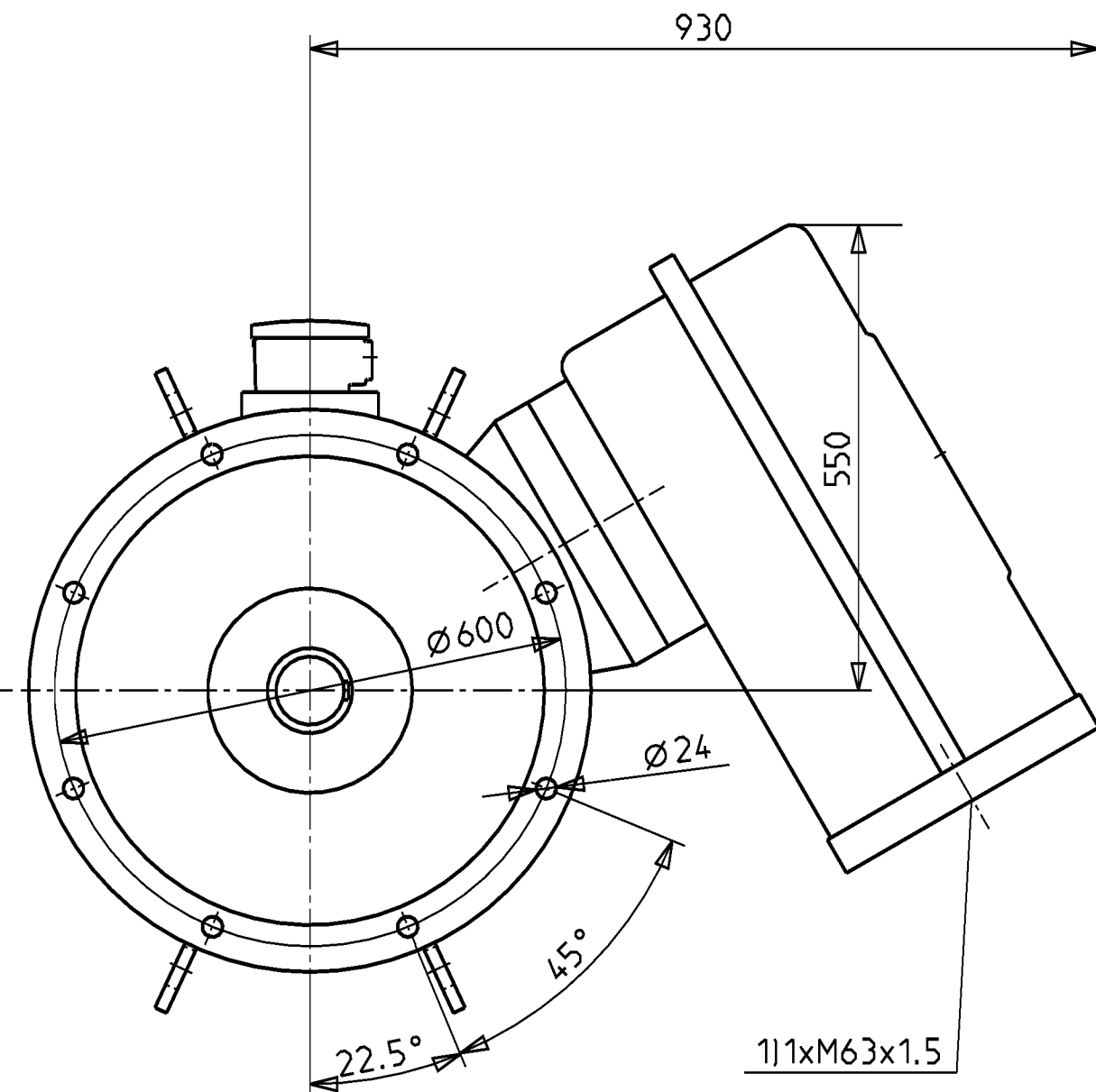
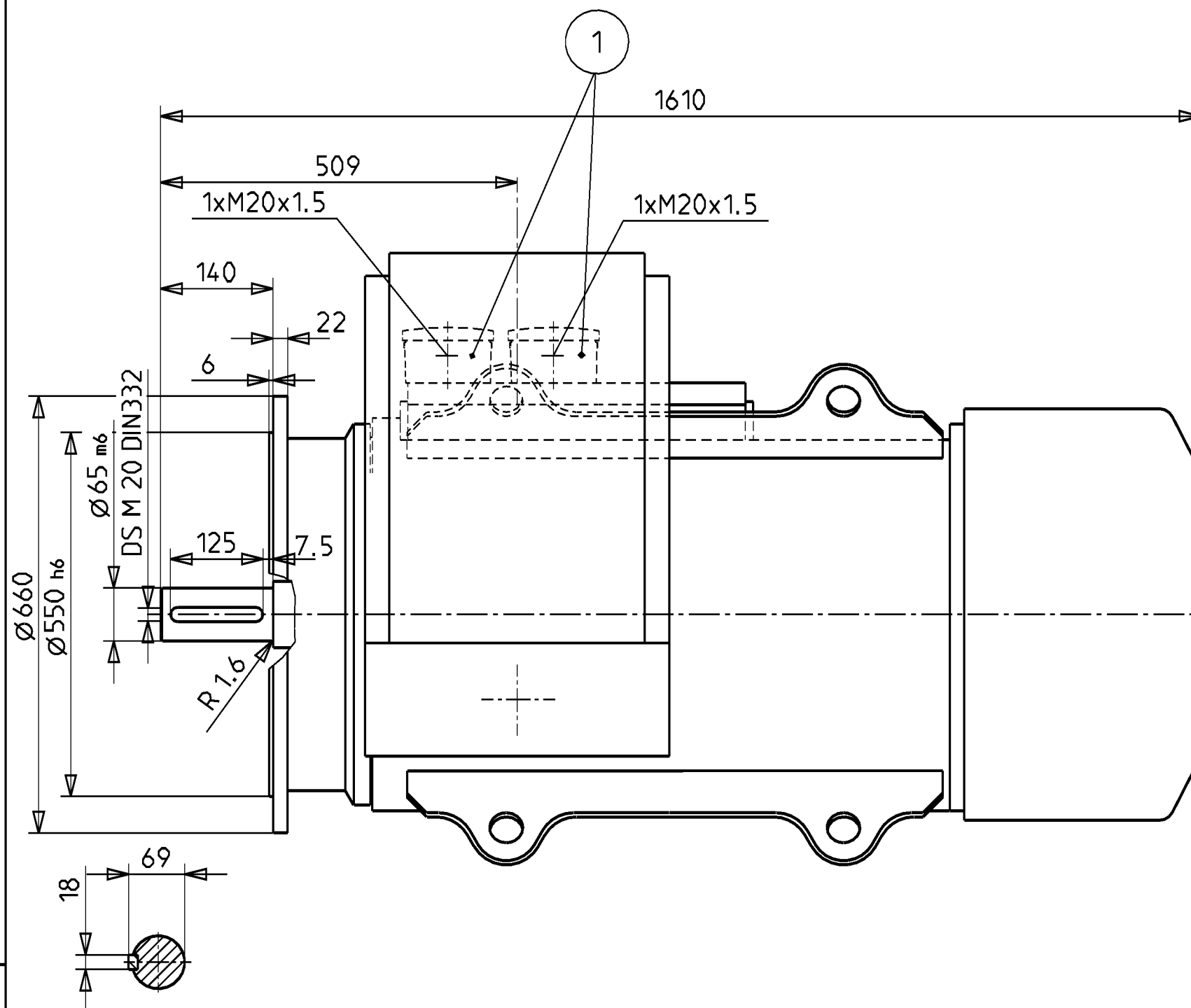
Paßfeder DIN 6885  
Key to DIN 6885

1 wahlweise Anschlußkasten für  
thermische Überwachung und Stillstandsheizung  
optionally terminal box for  
thermal monitoring and space heater

1) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

a	Änd.-Index Change index	Maß Mittellinie und Höhe AK von 865 auf 550 geändert, R2.5 -> R1.6 geändert
		Änderungs-Bemerkung Description of change

<b>FLENDER LOHER</b>		Erstellt Compiled		Letzte Änderung Last change		Drehstrommotor Three-phase-motor Typ/type: AJS.-315L.-04 Bauform/mounting: IM V1, IM B5				Zeichnung-Nr. Drawing No. <b>MLA31-1011</b>		Blatt Sheet		Sprache Language <b>de/en</b>	
Änderungen nur im CAD-E vornehmen.		Datum Date	Name Name	Datum Date	Name Name										
Diese technische Unterlage hat gesetzlichen Schutz (DIN34).  This technical document is proprietary (DIN34).	Bearbeitet, Designed	14.05.03	IMT28BA	19.05.03	IMT28BA	Plotdatum Print date	Plotersteller Printed by	für Abteilung for Department	Plotstatus Print status	Letzter Änd.-Index Last change index  a	Format DIN A Size DIN A  3				
	Geprüft, Checked	14.05.03	IMT2HK	19.05.03											
	Teileklasse Classification	20501	Bezeichnung Drawing title Maßblatt Dimension sheet												


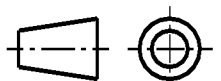


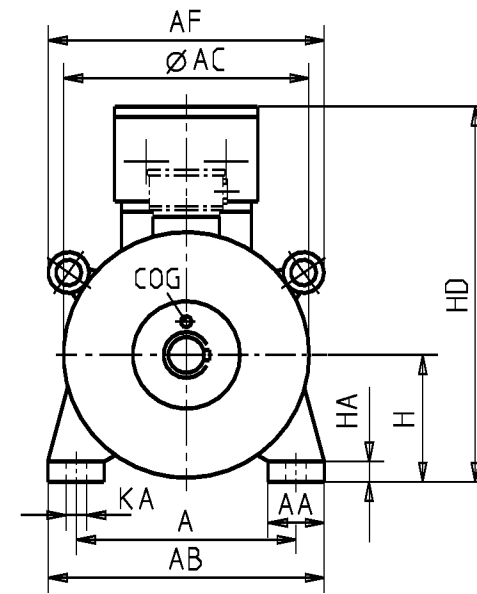
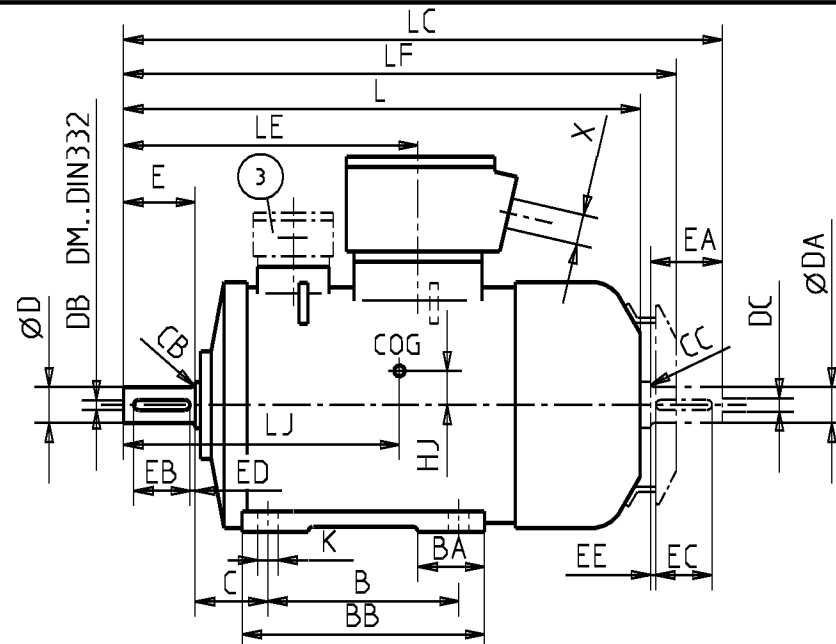
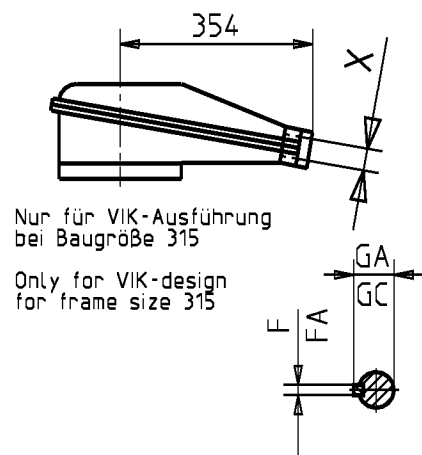
Paßfeder DIN 6885  
Key to DIN 6885

Geräuschgüte 3  
Noise class 3

1 wahlweise Anschlußkasten für  
thermische Überwachung und Stillstandsheizung  
optionally terminal box for  
thermal monitoring and space heater

1) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

		Änderungs-Bemerkung Description of change	<div></div> <div>Paßfeder DIN 6885 Key to DIN 6885</div> <div>Geräuschgüte 3 Nosie class 3</div> <div>1 wahlweise Anschlußkasten für thermische Überwachung und Stillstandsheizung optionally terminal box for thermal monitoring and space heater</div> <div>1) Abweichende Gewindegrößen nach Kunden-Auftrag Other thread sizes acc. customer order</div>																	
			<div><b>FLENDER LOHER</b></div> <div>Änderungen nur im CAD-E vornehmen.</div>		<div></div>		<div>Erstellt Compiled</div> <div>Datum Date</div> <div>Name Name</div>		<div>Letzte Änderung Last change</div> <div>Datum Date</div> <div>Name Name</div>		<div>Drehstrommotor Three-phase-motor Typ/type: AJS.-315L.-02 Bauform/mounting: IM V1, IM B5</div>				<div>Zeichnung-Nr. Drawing No.</div> <div>MLA31-1012</div>		<div>Blatt Sheet</div>		<div>Sprache Language</div> <div>de/en</div>	
			<div>Diese technische Unterlage hat gesetzlichen Schutz (DIN34).</div> <div>This technical document is proprietary (DIN34).</div>		<div>Bearbeitet, Designed</div> <div>Geprüft, Checked</div>		<div>19.05.03</div> <div>19.05.03</div>		<div>IMT28BA</div> <div>IMT2</div>											
			<div>Änd.-Index Change index</div>		<div>Teileklasse Classification</div> <div>20501</div>		<div>Bezeichnung Drawing title</div> <div>Maßblatt Dimension sheet</div>		<div>Plotdatum Print date</div>		<div>Plottersteller Printed by</div>		<div>für Abteilung for Department</div>		<div>Plotstatus Print status</div>		<div>Letzter Änd.-Index Last change index</div>		<div>Format DIN A Size DIN A</div> <div>3</div>	
1		2		3		4		5		6		7		8						



Paßfeder DIN 6885  
Toleranz für Wellenende bis  $\varnothing 28$  ISO j6,  
ab  $\varnothing 38$  ISO k6, über  $\varnothing 50$  ISO m6  
Klemmenkasten um je 90° drehbar  
Wahlweise Klemmenkasten EEx d IIC  
Für thermische Überwachung Einführung M20x1.5  
③ Ab Baugröße 200 zweiter Klemmenkasten für thermische  
Überwachung auf besondere Bestellung  
Wahlweise Klemmenkasten EEx d IIC

Key to DIN 6885  
Shaft end tolerance up to  $\varnothing 28$  ISO j6,  
up to  $\varnothing 38$  ISO k6, from  $\varnothing 50$  ISO m6  
Terminal box can be turned 90° in each direction  
Alternatively terminal box EEx d IIC  
Cable inlet M20x1.5 for thermal monitoring  
③ From frame size 200 on second terminal box for thermal  
monitoring upon special order  
Alternatively terminal box EEx d IIC

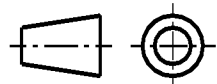
1) Klemmenkasten / Terminal box: EEx e II  
2) Klemmenkasten / Terminal box: EEx d IIC

4) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

COG=Schwerpunkt/Centre of gravity

Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	AF	B	BA	BB	C	D DA	DB DC	E EA	EB EC	ED EE	CB CC	F FA	GA GC	H	HA	HD <sup>1)</sup>	HD <sup>2)</sup>	HJ	K	KA	L	LC	LE	LF	LJ	X <sup>4)</sup>
071B.	2-8	112	30	140	151	-	90	30	110	45	14	M5	30	22	4	0.6	5	16	71	10	257	274	35	$\varnothing 7$	-	261	301	135	282	130	1xM25x1.5
080B.	2-8	125	35	160	163	-	100	35	130	50	19	M6	40	32	4	0.4	6	21.5	80	10	272	289	20	$\varnothing 9.5$	-	308	354	150	329	155	1xM25x1.5
090L.	2-8	140	40	180	186	200	125	40	155	56	24	M8	50	40	5	0.4	8	27	90	13	306	309	35	$\varnothing 10.5$	-	366	419	168.5	403	181	1xM25x1.5
100L.	2-8	160	45	205	197	210	140	45	170	63	28	M10	60	50	5	0.4	8	31	100	15	324	327	30	$\varnothing 12$	-	414	484	202.5	454	205	1xM32x1.5
112M.	2-8	190	50	240	229	250	140	60	185	70	28	M10	60	50	5	0.6	8	31	112	18	350	353	25	12	18	446	517	207	492	222	2xM32x1.5
132S.	2-8	216	50	260	270	263	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	18	390	456	40	12	18	494	585	248	552	265	2xM32x1.5
132M.	2-8	216	50	260	270	263	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	18	390	456	34	12	18	532	623	248	590	285	2xM32x1.5
160M.	2-8	254	60	310	314	312	210	60	255	108	42	M16	110	100	5	1	12	45	160	25	448	514	24	15	22	647	790	310	685	330	2xM40x1.5
160L.	2-8	254	60	310	314	312	254	60	299	108	42	M16	110	100	5	1	12	45	160	25	448	514	20	15	22	691	834	310	729	350	2xM40x1.5
180M.	2 4-8	279	70	345	344	355	241	80	300	121	48	M16	110	100	5	1	14	51.5	180	28	525	547	20	15	25	702 652	832	351.5 697	809 697	350	2xM40x1.5
180L.	2 4-8	279	70	345	344	355	279	80	340	121	48	M16	110	100	5	1	14	51.5	180	28	525	547	18	15	25	740 690	870	370.5 735	847 735	370	2xM40x1.5
200L.	2-8	318	80	400	390	406	305	100	365	133	55	M20	110	100	5	1.6	16	59	200	30	597	597	49	20	26	822	1000	485.5	884	460	2xM50x1.5
225S.	2 4-8	356	90	450	438	543	286	110	370	149	55 60	M20	110 140	100 125	5 7.5	1.6 1.6	16 18	59 64	225	32	654	654	44	20	26	873 903	1014 1074	497 527	957 987	460 490	2xM50x1.5
225M.	2 4-8	356	90	450	438	543	311	110	395	149	55 60	M20	110 140	100 125	5 7.5	1.6 1.6	16 18	59 64	225	32	654	654	44	20	26	873 903	1014 1074	497 527	957 987	460 490	2xM50x1.5
250M.	2 4-8	406	100	505	490	475	349	110	420	168	60 65	M20	140	125	7.5	1.6	18	64 69	250	35	717	717	33	26	38	974	1148	535	1074	530	2xM63x1.5
280S.	2 4-8	457	110	570	550	550	368	120	470	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	870	867	42	26	38	1053	1232	589	1165	550	2xM63x1.5
280M.	2 4-8	457	110	570	550	550	419	120	520	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	870	867	39	26	38	1118	1297	589	1230	580	2xM63x1.5
315S.	2 4-8	508	120	630	622	570	406	130	520	216	65 80	M20	140 170	125 140	7.5 15	1.6 2.5	18 22	69 85	315	30	925	922	31	$\varnothing 28$	-	1121 1223	1320 1443	608 638	1284 1335	640 670	2xM63x1.5
315M.	2 4-8	508	120	630	622	570	457	130	570	216	65 80	M20	140 170	125 140	7.5 15	1.6 2.5	18 22	69 85	315	30	925	922	27	$\varnothing 28$	-	1241 1343	1440 1563	608 638	1404 1455	655 685	2xM63x1.5
315L.	2 4-8	508	120	630	622	570	508	130	621	216	65 80	M20	140 170	125 140	7.5 15	1.6 2.5	18 22	69 85	315	30	978	978	30	$\varnothing 28$	-	1351 1453	1550 1673	653 683	1514 1565	670 700	2xM63x1.5

FLENDER  
LOHER



Erstellt  
Compiled

Letzte Änderung  
Last change

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: DNG./DNS.  
Bauform/mounting: IM B3, IM V5, IM V6 DIN 42673

Zeichnung-Nr.  
Drawing No.

MLD00-0023

Blatt  
Sheet

1

Sprache  
Language

de/en

Diese technische Unterlage hat  
gesetzlichen Schutz (DIN34).

Bearbeitet, Designed  
Geprüft, Checked

18.06.02 Schiestl K. 12.01.04 IMT26KA  
18.06.02 IMT2HK 12.01.04 IMT2

Plotdatum  
Print date

Plottersteller  
Printed by

für Abteilung  
for Department

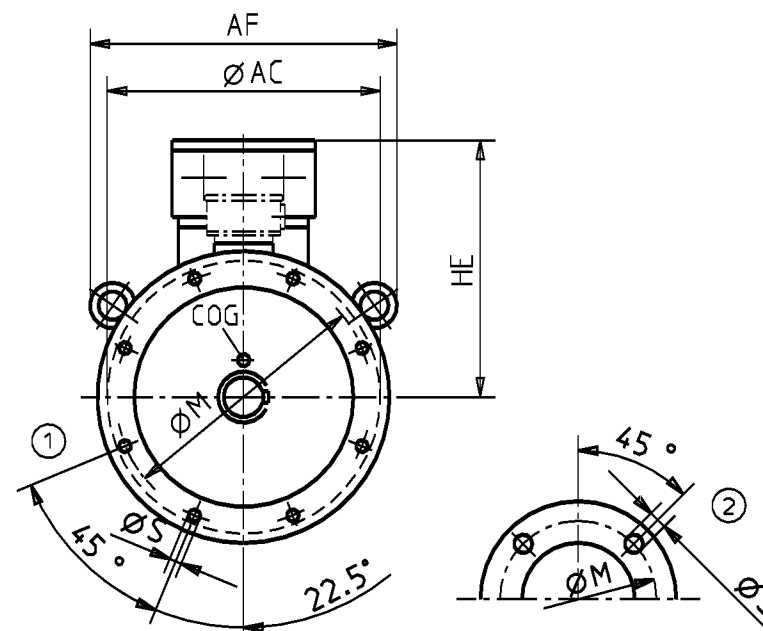
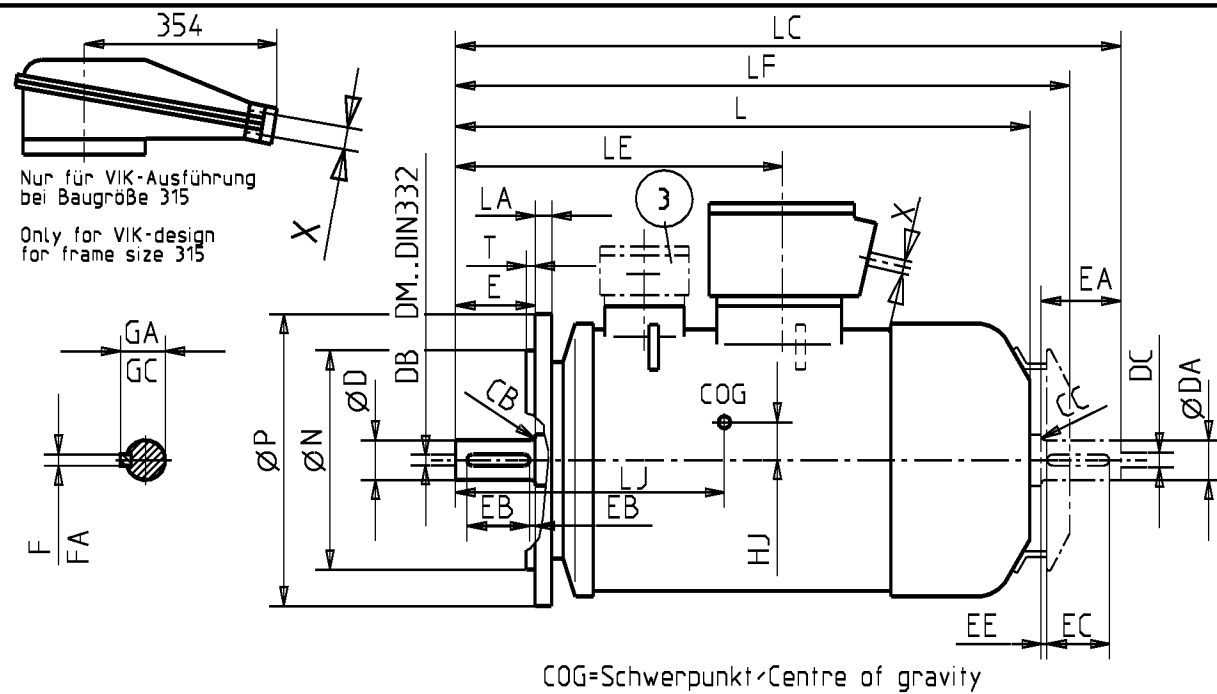
Plotstatus  
Print status

Letzter Änd.-Index  
Last change index

d

Format DIN A  
Size DIN A

3



Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
① Lage der Flanschbohrungen ab Flansch- Ø P=450  
② Lage der Flanschbohrungen bis einschl. Flansch- Ø P=400  
Paßfeder DIN 6885  
Toleranz für Wellenende bis Ø 28 ISO j6,  
ab Ø 38 ISO k6, über Ø 50 ISO m6  
Toleranz bis N= Ø 250 ISO j6, ab N= Ø 300 ISO h6  
Klemmenkasten um je 90° drehbar  
Wahlweise Klemmenkasten EEx d IIC  
Für thermische Überwachung Einführung M20x1.5  
Überwachung auf besondere Bestellung  
Wahlweise Klemmenkasten EEx d IIC

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400

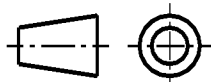
Key to DIN 6885  
Shaft end tolerance up to Ø 28 ISO j6,  
up to Ø 38 ISO k6, from Ø 50 ISO m6  
Tolerance up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
Terminal box can be turned 90° in each direction  
Alternatively terminal box EEx d IIC  
Cable inlet M20x1.5 for thermal monitoring  
③ From frame size 200 on second terminal box for thermal monitoring upon special order  
Alternatively terminal box EEx d IIC

4) Klemmenkasten / Terminal box: EEx e II  
5) Klemmenkasten / Terminal box: EEx d IIC

6) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	AC	AF	D DA	DB DC	E EA	EB EC	ED EE	CB CC	F FA	GA GC	HE <sup>4)</sup>	HE <sup>5)</sup>	HJ	L	LA	LC	LE	LF	LJ	M	N	P	S	T	X <sup>6)</sup>
071B.	2-8	151	-	14	M5	30	22	4	0.6	5	16	186	203	40	261	10	301	135	282	130	130	110	160	9.5	3.5	1xM25x1.5
080B.	2-8	163	-	19	M6	40	32	4	0.4	6	21.5	192	209	25	308	10	354	150	329	155	165	130	200	11.5	3.5	1xM25x1.5
090L.	2-8	186	200	24	M8	50	40	5	0.4	8	27	216	219	40	366	10	419	168.5	403	181	165	130	200	11.5	3.5	1xM25x1.5
100L.	2-8	197	210	28	M10	60	50	5	0.6	8	31	224	227	35	414	11	484	202.5	454	205	215	180	250	14	4	1xM32x1.5
112M.	2-8	229	250	28	M10	60	50	5	0.6	8	31	238	241	27	446	11	517	207	492	222	215	180	250	14	4	2xM32x1.5
132S.	2-8	270	263	38	M12	80	70	5	0.6	10	41	258	324	45	494	12	585	248	552	265	265	230	300	14	4	2xM32x1.5
132M.	2-8	270	263	38	M12	80	70	5	0.6	10	41	258	324	38	532	12	623	248	590	285	265	230	300	14	4	2xM32x1.5
160M.	2-8	314	312	42	M16	110	100	5	1	12	45	288	354	30	647	20	790	310	685	365	300	250	350	18	5	2xM40x1.5
160L.	2-8	314	312	42	M16	110	100	5	1	12	45	288	354	25	691	20	834	310	729	385	300	250	350	18	5	2xM40x1.5
180M.	2 4-8	344	355	48	M16	110	100	5	1	14	51.5	335	367	27	702 652	20	832	351.5 697	809 697	350	300	250	350	18	5	2xM40x1.5
180L.	2 4-8	344	355	48	M16	110	100	5	1	14	51.5	335	367	24	740 690	20	870	370.5 735	847 735	370	300	250	350	18	5	2xM40x1.5
200L.	2-8	390	406	55	M20	110	100	5	1.6	16	59	397	397	56	822	20	1000	485.5	884	460	350	300	400	18	5	2xM50x1.5
225S. -M.	2 4-8	438	543	55 60	M20	110 140	100 125	5 7.5	1.6 1.6	16 18	59 64	429	429	53	873 903	16	1014 1074	497 527	957 987	460 490	400	350	450	18	5	2xM50x1.5
250M.	2 4-8	490	475	60 65	M20	140	125	7.5	1.6	18	64 69	467	467	43	974	18	1148	535	1074	530	500	450	550	18	5	2xM63x1.5
280S.	2 4-8	550	550	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	590	587	54	1053	18	1232	589	1165	545	500	450	550	18	5	2xM63x1.5
280M.	2 4-8	550	550	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	590	587	50	1118	18	1297	589	1230	570	500	450	550	18	5	2xM63x1.5
315S.	2 4-8	622	570	65 80	M20	140 170	125 140	7.5 15	1.6 2.5	18 22	69 85	610	607	44	1121 1223	22	1320 1443	608 638	1284 1335	640 670	600	550	660	24	6	2xM63x1.5
315M.	2 4-8	622	570	65 80	M20	140 170	125 140	7.5 15	1.6 2.5	18 22	69 85	610	607	39	1241 1343	22	1440 1563	608 638	1404 1455	655 685	600	550	660	24	6	2xM63x1.5
315L.	2 4-8	622	570	65 80	M20	140 170	125 140	7.5 15	1.6 2.5	18 22	69 85	663	663	42	1351 1453	22	1550 1673	653 683	1514 1565	670 700	600	550	660	24	6	2xM63x1.5

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Erstellt  
Compiled

Letzte Änderung  
Last change

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: DNG./DNS.  
Bauform/mounting: IM B5, IM V1, IM V3 DIN 42677

Zeichnung-Nr.  
Drawing No.

MLD00-0024

Blatt  
Sheet

1

Sprache  
Language

de/en

Diese technische Unterlage hat  
gesetzlichen Schutz (DIN34).

Bearbeitet, Designed

18.06.02 Schiestl K. 12.01.04 IMT26KA

Geprüft, Checked

18.06.02 IMT2HK 12.01.04 IMT2

This technical document  
is proprietary (DIN34).

Teileklasse  
Classification

20501

Bezeichnung  
Drawing title

Maßblatt  
Dimension sheet

Plotdatum  
Print date

Plottersteller  
Printed by

für Abteilung  
for Department

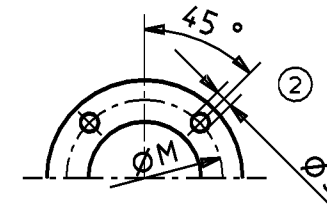
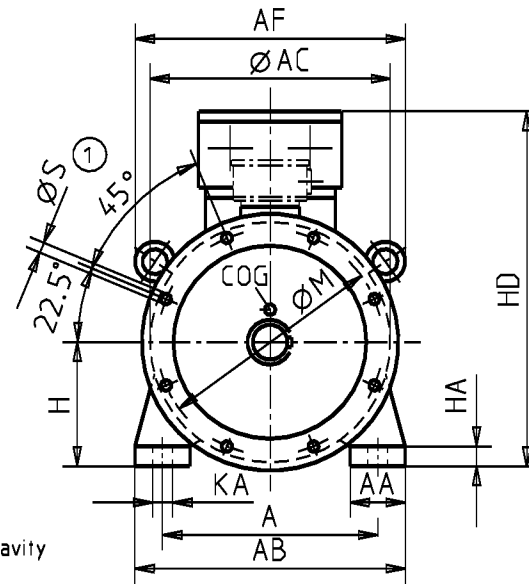
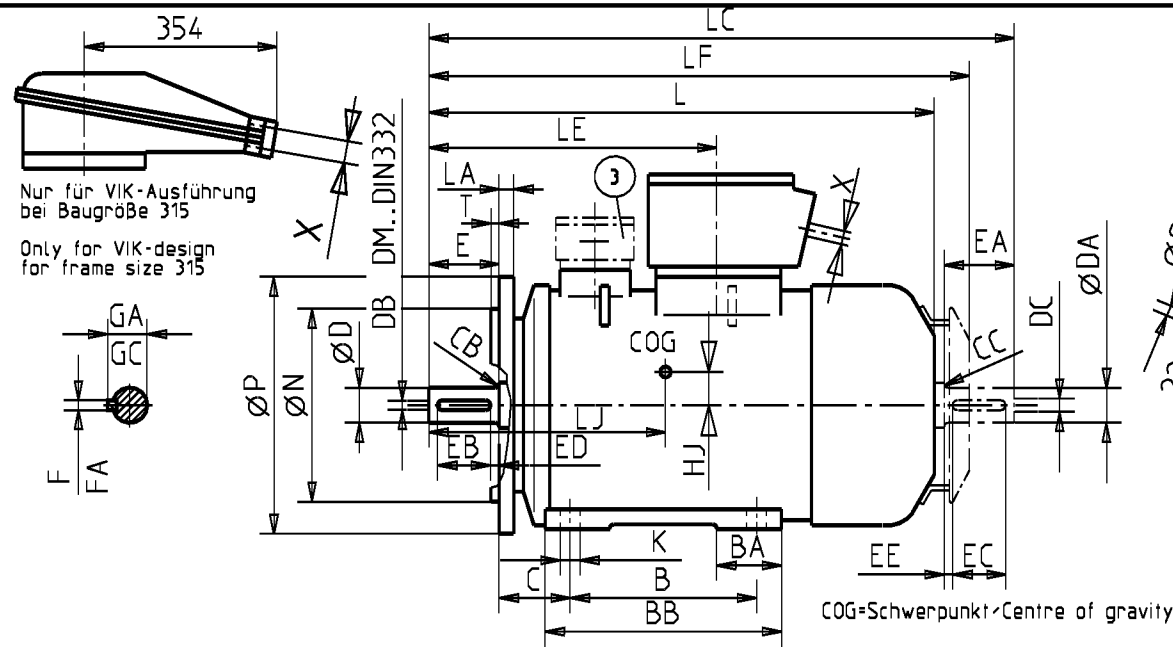
Plotstatus  
Print status

Letzter Änd.-Index  
Last change index

e

Format DIN A  
Size DIN A

3



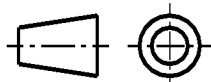
Flanschlage: Die Anschraublfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
① Lage der Flanschbohrungen ab Flansch- Ø P=450  
② Lage der Flanschbohrungen bis einschl. Flansch- Ø P=400  
Paßfeder DIN 6885  
Toleranz für Wellenende bis Ø 28 ISO j6,  
ab Ø 38 ISO k6, über Ø 50 ISO m6  
Toleranz bis N= Ø 250 ISO j6, ab N= Ø 300 ISO h6  
Klemmenkasten um je 90° drehbar  
Wahlweise Klemmenkasten EEx d IIC  
Für thermische Überwachung Einführung M20x1.5  
③ Ab Baugröße 200 zweiter Klemmenkasten für thermische Überwachung auf besondere Bestellung  
Wahlweise Klemmenkasten EEx d IIC

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400  
Key to DIN 6885  
Shaft end tolerance up to Ø 28 ISO j6,  
up to Ø 38 ISO k6, from Ø 50 ISO m6  
Tolerance up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
Terminal box can be turned 90° in each direction  
Alternatively terminal box EEx d IIC  
Cable inlet M20x1.5 for thermal monitoring  
③ From frame size 200 on second terminal box for thermal monitoring upon special order  
Alternatively terminal box EEx d IIC

4) Klemmenkasten / Terminal box: EEx e II  
5) Klemmenkasten / Terminal box: EEx d IIC  
6) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	AF	B	BA	BB	C	D DA	DB DC	E EA	EB EC	ED EE	CB CC	F FA	GA GC	H	HA	HD <sup>4)</sup>	HD <sup>5)</sup>	HJ	K	KA	L	LA	LC	LE	LF	LJ	M	N	P	S	T	X <sup>6)</sup>
071B.	2-8	112	30	140	151	-	90	30	110	45	14	M5	30	22	4	0.6	5	16	71	10	257	274	35	Ø7	-	261	10	301	135	282	130	130	110	160	9.5	3.5	1xM25x1.5
080B.	2-8	125	35	160	163	-	100	35	130	50	19	M6	40	32	4	0.4	6	21.5	80	10	272	289	20	Ø9.5	-	308	10	354	150	329	155	165	130	200	11.5	3.5	1xM25x1.5
090L.	2-8	140	40	180	186	200	125	40	155	56	24	M8	50	40	5	0.4	8	27	90	13	306	309	35	Ø10.5	-	366	10	419	168.5	403	181	165	130	200	11.5	3.5	1xM25x1.5
100L.	2-8	160	45	205	197	210	140	45	170	63	28	M10	60	50	5	0.4	8	31	100	15	324	327	30	Ø12	-	414	11	484	202.5	454	205	215	180	250	14	4	1xM32x1.5
112M.	2-8	190	50	240	229	250	140	60	185	70	28	M10	60	50	5	0.6	8	31	112	18	350	353	25	12	18	446	11	517	207	492	222	215	180	250	14	4	2xM32x1.5
132S.	2-8	216	50	260	270	263	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	18	390	456	40	12	18	494	12	585	248	552	265	265	230	300	14	4	2xM32x1.5
132M.	2-8	216	50	260	270	263	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	18	390	456	34	12	18	532	12	623	248	590	285	265	230	300	14	4	2xM32x1.5
160M.	2-8	254	60	310	314	312	210	60	255	108	42	M16	110	100	5	1	12	45	160	25	448	514	24	15	22	647	20	790	310	685	330	300	250	350	18	5	2xM40x1.5
160L.	2-8	254	60	310	314	312	254	60	299	108	42	M16	110	100	5	1	12	45	160	25	448	514	20	15	22	691	20	834	310	729	350	300	250	350	18	5	2xM40x1.5
180M.	2 4-8	279	70	345	344	355	241	80	300	121	48	M16	110	100	5	1	14	51.5	180	28	515	547	20	15	25	702 652	20	832	351.5 697	809 697	350	300	250	350	18	5	2xM40x1.5
180L.	2 4-8	279	70	345	344	355	279	80	340	121	48	M16	110	100	5	1	14	51.5	180	28	515	547	18	15	25	740 690	20	870	370.5 735	847 735	370	300	250	350	18	5	2xM40x1.5
200L.	2-8	318	80	400	390	406	305	100	365	133	55	M20	110	100	5	1.6	16	59	200	30	597	597	49	20	26	822	20	1000	485.5	884	460	350	300	400	18	5	2xM50x1.5
225S.	2 4-8	356	90	450	438	543	286	110	370	149	55 60	M20	110 140	100 125	5 7.5	1.6 1.6	16 18	59 64	225	32	654	654	44	20	26	873 903	16	1014 1074	497 527	957 987	460 490	400	350	450	18	5	2xM50x1.5
225M.	2 4-8	356	90	450	438	543	311	110	395	149	55 60	M20	110 140	100 125	5 7.5	1.6 1.6	16 18	59 64	225	32	654	654	44	20	26	873 903	16	1014 1074	497 527	957 987	460 490	400	350	450	18	5	2xM50x1.5
250M.	2 4-8	406	100	505	490	475	349	110	420	168	60 65	M20	140	125	7.5	1.6	18	64 69	250	35	717	717	33	26	38	974	18	1148	535	1074	530	500	450	550	18	5	2xM63x1.5
280S.	2 4-8	457	110	570	550	550	368	120	470	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	870	867	42	26	38	1053	18	1232	589	1165	550	500	450	550	18	5	2xM63x1.5
280M.	2 4-8	457	110	570	550	550	419	120	520	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	870	867	39	26	38	1118	18	1297	589	1230	580	500	450	550	18	5	2xM63x1.5
315S.	2 4-8	508	120	630	622	570	406	130	520	216	65 80	M20	140 170	125 140	7.5 15	1.6 2.5	18 22	69 85	315	30	925	922	31	28	-	1121 1223	22	1320 1443	608 638	1284 1335	640 670	600	550	660	24	6	2xM63x1.5
315M.	2 4-8	508	120	630	622	570	457	130	570	216	65 80	M20	140 170	125 140	7.5 15	1.6 2.5	18 22	69 85	315	30	925	922	27	28	-	1241 1343	22	1440 1563	608 638	1404 1455	655 685	600	550	660	24	6	2xM63x1.5
315L.	2 4-8	508	120	630	622	570	508	130	621	216	65 80	M20	140 170	125 140	7.5 15	1.6 2.5	18 22	69 85	315	30	978	978	30	28	-	1351 1453	22	1550 1673	653 683	1514 1565	670 700	600	550	660	24	6	2xM63x1.5

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Erstellt  
Compiled

Letzte Änderung  
Last change

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: DNG./DNS.  
Bauform/mounting: IM B35, IM V15, IM V36 DIN42673 + DIN42677

Zeichnung-Nr.  
Drawing No.

MLD00-0025

Blatt  
Sheet

1

Sprache  
Language

de/en

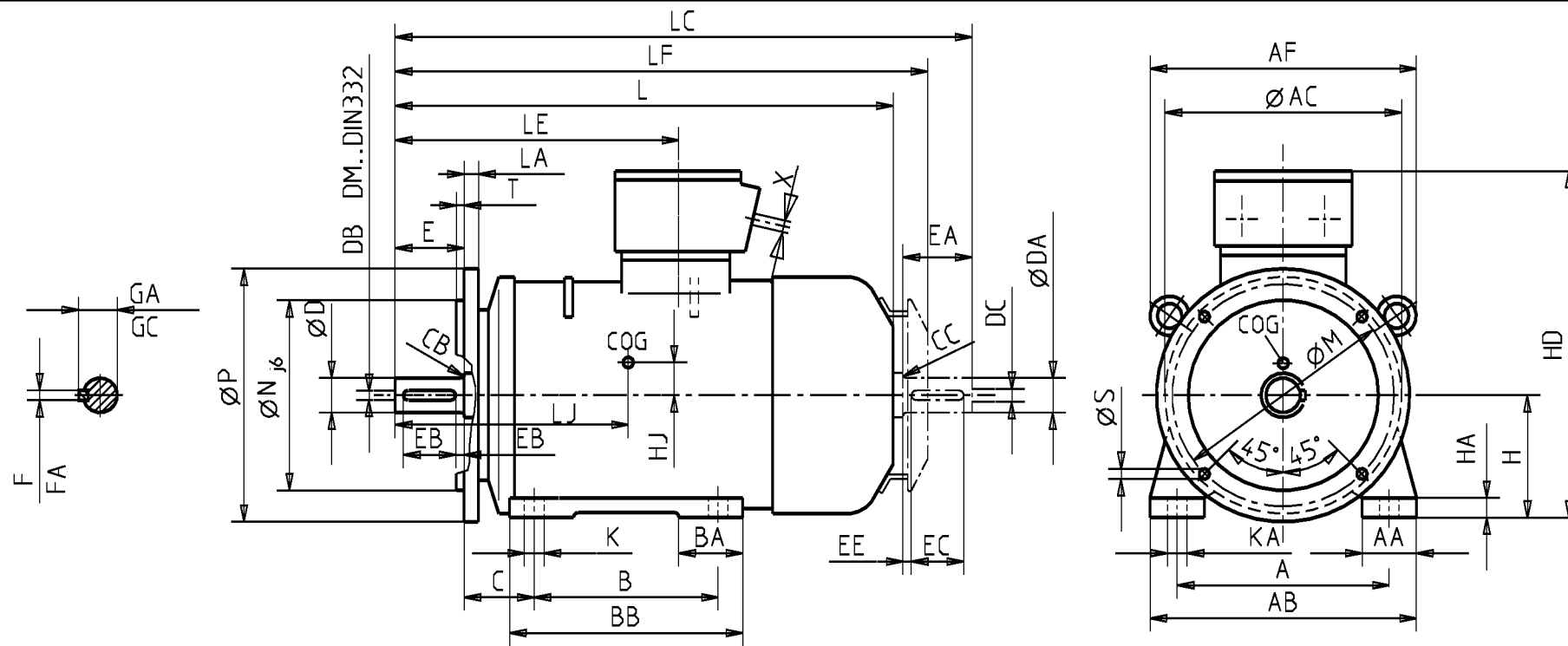
Letzter Änd.-Index  
Last change index

e

Format DIN A  
Size DIN A

3





Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
Paßfeder DIN 6885  
Toleranz für Wellenende bis  $\varnothing 28$  ISO j6, ab  $\varnothing 38$  ISO k6  
Klemmenkasten um je 90° drehbar  
Wahlweise Klemmenkasten EEx d IIC  
Für thermische Überwachung Einführung M20x1.5

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
Key to DIN 6885  
Shaft end tolerance up to  $\varnothing 28$  ISO j6, up to  $\varnothing 38$  ISO k6  
Terminal box can be turned 90° in each direction  
Alternatively terminal box EEx d IIC  
Cable inlet M20x1.5 for thermal monitoring

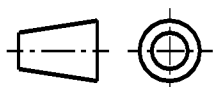
- 1) Klemmenkasten / Terminal box: EEx e II
- 2) Klemmenkasten / Terminal box: EEx d IIC
- 3) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

COG=Schwerpunkt/Centre of gravity

### Flansch wahlweise / Flange optionally

Baugröße frame size	Polzahl number of poles	Type 1																		Type 2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
		LA	M	N	P	S	T	LA	M	N	P	S	T	LA	M	N	P	S	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				

**FLENDER  
LOHER**



Erstellt  
Compiled

Letzte Änderung  
Last change

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: DNG.  
Bauform/mounting: IM B34, IM V5/IM V18, IM V6/IM V19

Zeichnung-Nr.  
Drawing No.

MLD00-0027

Blatt  
Sheet

Sprache  
Language

de/en

Diese technische Unterlage hat  
gesetzlichen Schutz (DIN34).

Bearbeitet, Designed  
Geprüft, Checked

18.06.02 Schiestl K 17.11.03 IMT26KA  
18.06.02 IMT2HK 17.11.03 IMT2

Plotdatum  
Print date

Plotersteller  
Printed by

für Abteilung  
for Department

Plotstatus  
Print status

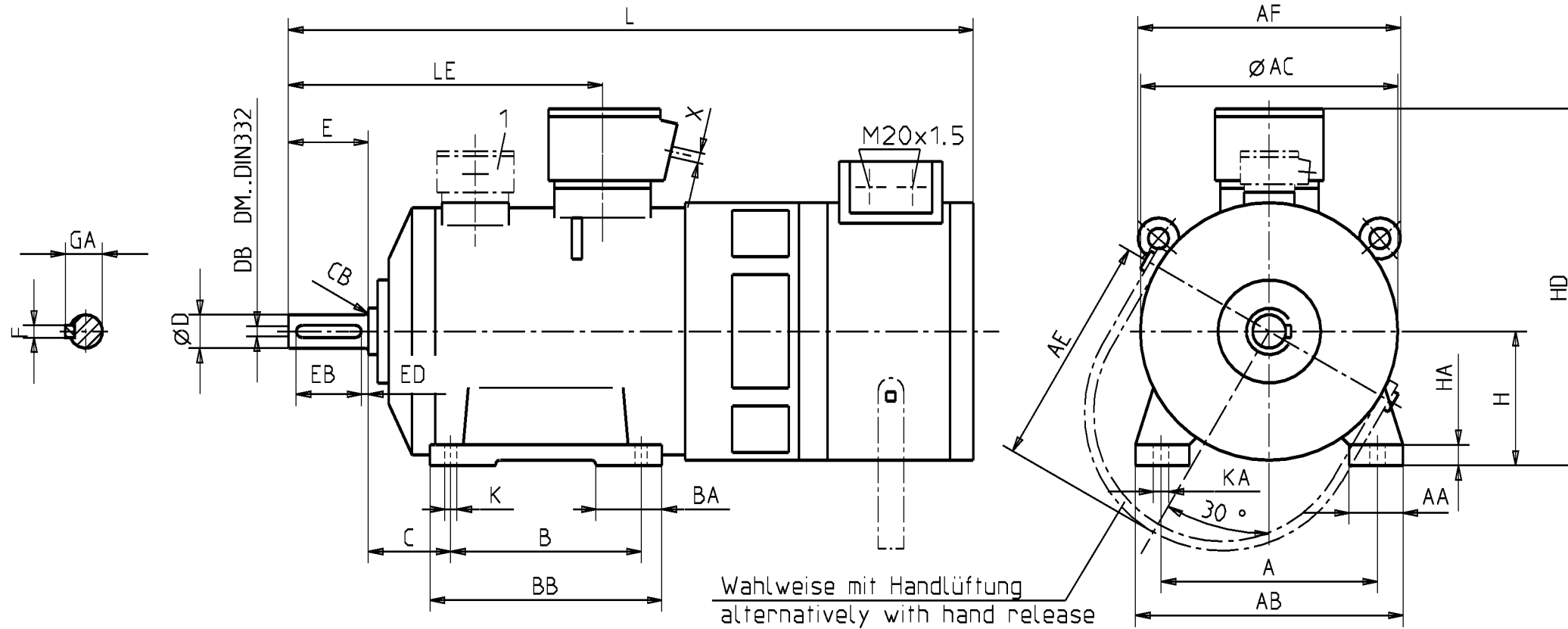
Letzter Änd.-Index  
Last change index

d

Format DIN A  
Size DIN A

3





Paßfeder DIN 6885  
Toleranz für Wellenende bis  $\varnothing 28$  ISO j6,  
ab  $\varnothing 38$  ISO k6, über  $\varnothing 50$  ISO m6  
Klemmenkasten um je 90° drehbar  
Wahlweise Klemmenkasten EExdIIc  
Für thermische Überwachung Einführung M20x1,5  
1) Ab Baugröße 200 zweiter Klemmenkasten für thermische  
Überwachung auf besondere Bestellung  
Wahlweise Klemmenkasten EExdIIc

Key to DIN 6885  
Shaft end tolerance up to  $\varnothing 28$  ISO j6,  
up to  $\varnothing 38$  ISO k6, from  $\varnothing 50$  ISO m6  
Terminal box can be turned 90° in each direction  
Alternatively terminal box EExdIIc  
Cable inlet M20x1,5 for thermal monitoring  
1) From frame size 200 on second terminal box for thermal  
monitoring upon special order  
Alternatively terminal box EExdIIc

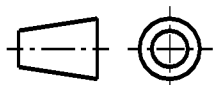
2) Klemmenkasten / Terminal box: EExell  
3) Klemmenkasten / Terminal box: EExdIIc

4) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

Größe Size	Federdruckbremse Typ 76 Spring-loaded brake type 76					
	10	11	13	16	19	24
M <sub>2N</sub> (Nm)	10	20	50	100	150	270

Baugröße frame size	Polzahl number of poles	A	AA	AB	AF	B	BA	BB	C	D	DB	E	EB	ED	CB	F	GA	H	HA	HD <sub>2</sub>	HD <sub>3</sub>	K	KA	LE	X <sup>4)</sup>	Br.Größe 10-11 Brake size			Br.Größe 13-16 Brake size			Br.Größe 19-24 Brake size		
																										AC	AE	L	AC	AE	L	AC	AE	L
080B.	2-8	125	35	160	-	100	35	130	50	19	M6	40	32	4	0.4	6	21.5	80	10	272	289	9.5	-	150	1xM25x1.5	185	134	456	-	-	-	-	-	-
090L.	2-8	140	40	180	204	125	40	155	56	24	M8	50	40	5	0.4	8	27	90	13	306	309	10.5	-	168.5	1xM25x1.5	185	134	513	-	-	-	-	-	-
100L.	2-8	160	45	205	210	140	45	170	63	28	M10	60	50	5	0.4	8	31	100	15	324	327	12	-	203	1xM32x1.5	205	134	569	245	164	593	-	-	-
112M.	2-8	190	50	240	250	140	60	185	70	28	M10	60	50	5	0.6	8	31	112	18	350	353	12	18	207	2xM32x1.5	228	134	589	245	164	619	-	-	-
132S.	2-8	216	50	266	293	140	60	185	89	38	M12	80	70	5	0.6	10	41	132	18	417	449	12	18	248	2xM32x1.5	-	-	-	264	164	674	-	-	-
132M.	2-8	216	50	266	293	178	60	225	89	38	M12	80	70	5	0.6	10	41	132	18	417	449	12	18	248	2xM32x1.5	-	-	-	264	164	712	-	-	-
160M.	2-8	254	60	310	338	210	70	225	108	42	M16	110	100	5	1	12	45	160	25	485	517	15	22	310	2xM40x1.5	-	-	-	320	164	829	330	215	840
160L.	2-8	254	60	310	338	254	70	300	108	42	M16	110	100	5	1	12	45	160	25	485	517	15	22	310	2xM40x1.5	-	-	-	320	164	873	330	215	884
180M.	2 4-8	279	70	345	355	241	80	300	121	48	M16	110	100	5	1	14	51.5	180	28	515	547	15	25	351.5	2xM40x1.5	-	-	-	-	-	-	351	215	871 846
180L.	2 4-8	279	70	345	355	279	80	340	121	48	M16	110	100	5	1	14	51.5	180	28	515	547	15	25	370.5	2xM40x1.5	-	-	-	-	-	-	351	215	909 884
200L.	2-8	318	80	400	406	305	100	365	133	55	M20	110	100	5	1.6	16	59	200	30	597	597	20	26	485.5	2xM50x1.5	-	-	-	-	-	-	394	215	1042

FLENDER  
LOHER



Erstellt  
Compiled

Letzte Änderung  
Last change

Drehstrommotor  
Three-phase motors  
Typ / type: DBG.-..  
Bauform / mounting: IM B3, IM V5, IM V6

Zeichnung-Nr.  
Drawing No.

MLD00-0028

Blatt  
Sheet

Sprache  
Language

de/en

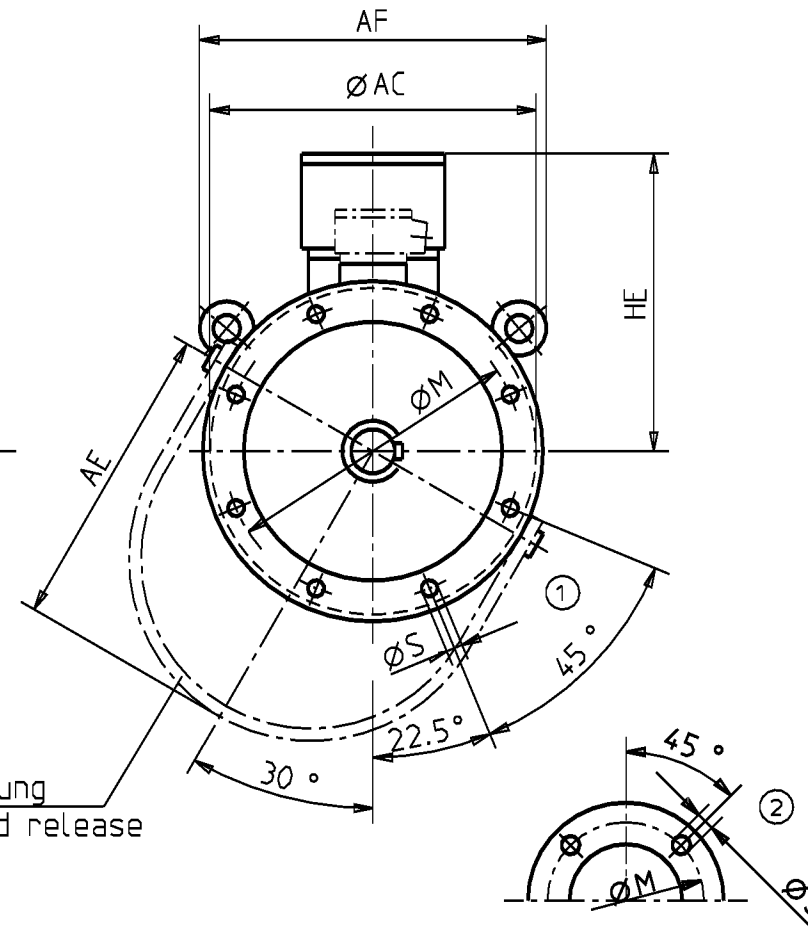
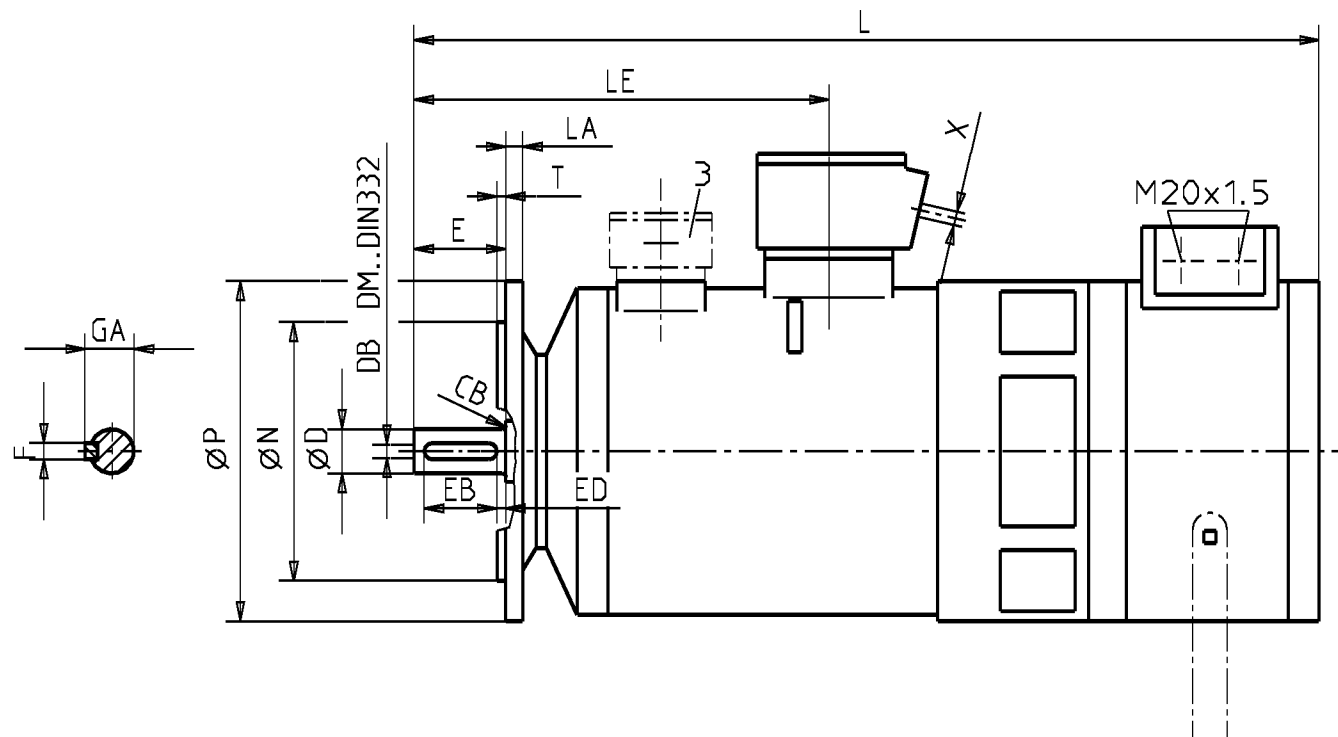
Letzter Änd.-Index  
Last change index

d

Format DIN A  
Size DIN A

3





Wahlweise mit Handlüftung  
alternatively with hand release

Flanschlage: Die Anschraublfläche des Flansches liegt  
mit der Kante der Wellenschulter in einer Ebene  
① Lage der Flanschbohrungen ab Flansch- Ø P=450  
② Lage der Flanschbohrungen bis einschl. Flansch- Ø P=400

Paßfeder DIN 6885  
Toleranz für Wellenende bis Ø 28 ISO j6,  
ab Ø 38 ISO k6, über Ø 50 ISO m6  
Toleranz bis N= Ø 250 ISO j6, an N= Ø 300 ISO h6  
Klemmenkasten um je 90° drehbar  
Wahlweise Klemmenkasten EExdIIc  
Für thermische Überwachung Einführung M20x1,5  
3) Ab Baugröße 200 zweiter Klemmenkasten für thermische  
Überwachung auf besondere Bestellung  
Wahlweise Klemmenkasten EExdIIc

Flange-position: The joining-side of the flange is position  
in a straight line with the shaft shoulder  
① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400

Key to DIN 6885  
Shaft end tolerance up to Ø 28 ISO j6,  
up to Ø 38 ISO k6, from Ø 50 ISO m6  
Tolerance up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
Terminal box can be turned 90° in each direction  
Alternatively terminal box EExdIIc  
Cable inlet M20x1,5 for thermal monitoring  
3) From frame size 200 on second terminal box for thermal  
monitoring upon special order  
Alternatively terminal box EExdIIc

4) Klemmenkasten / Terminal box: EExell  
5) Klemmenkasten / Terminal box: EExdIIc

6) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

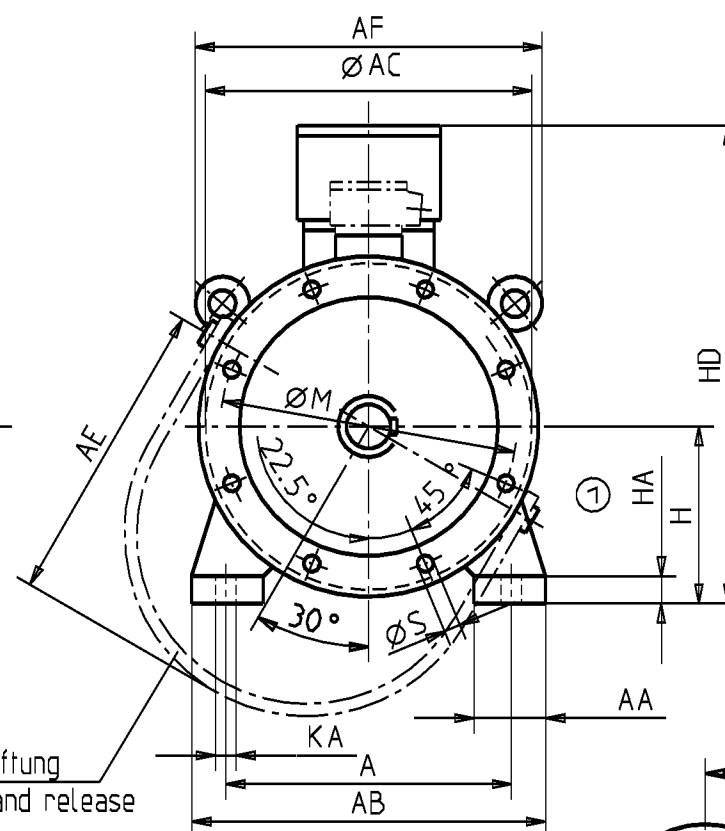
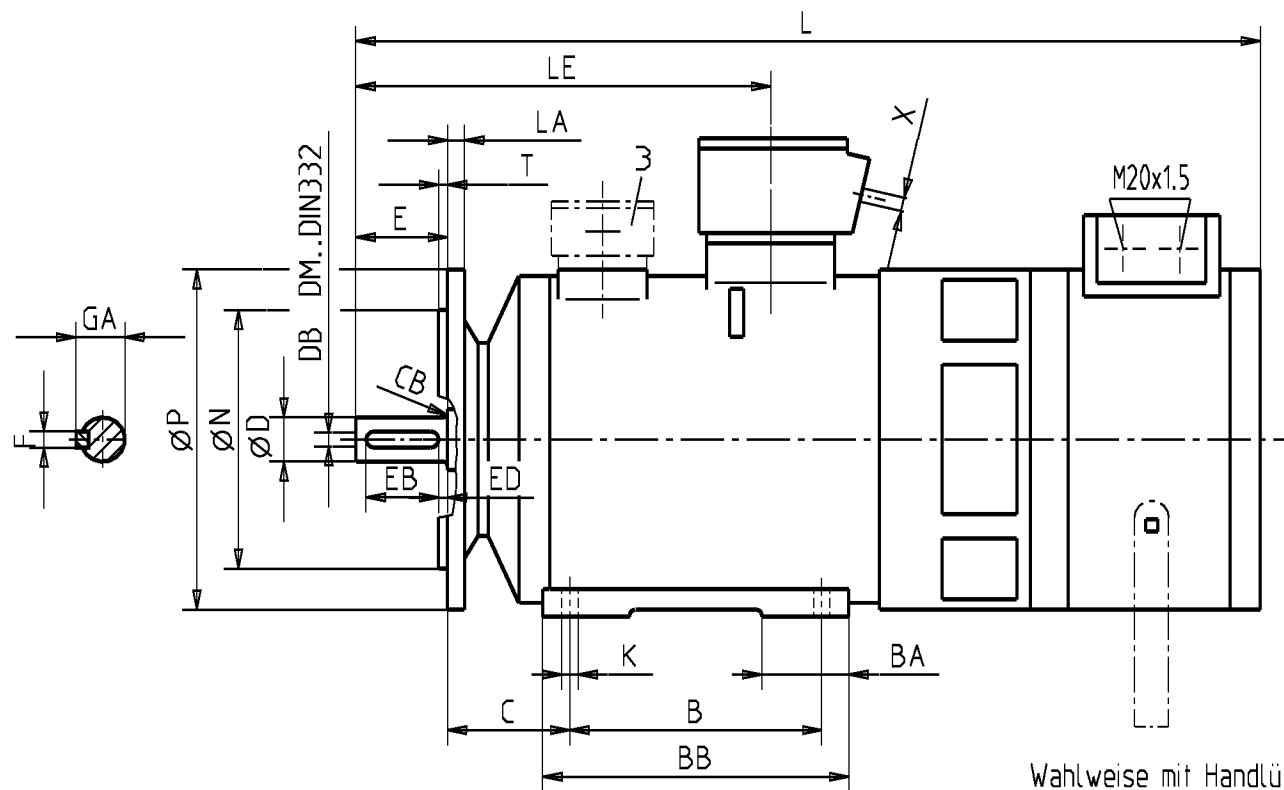
Größe Size	Federdruckbremse Typ 76 Spring-loaded brake type 76					
	10	11	13	16	19	24
M <sub>2N</sub> (Nm)	10	20	50	100	150	270

Br.Größe 10-11	Br.Größe 13-16	Br.Größe 19-24
Brake size	Brake size	Brake size

Baugröße frame size	Polzahl number of poles	AF	D	DB	E	EB	ED	CB	F	GA	HE <sub>4</sub>	HE <sub>5</sub>	LA	LE	M	N	P	S	T	X <sub>6</sub>
080B.	2-8	-	19	M6	40	32	4	0.4	6	21.5	192	209	10	150	165	130	200	11.5	3.5	1xM25x1.5
090L.	2-8	204	24	M8	50	40	5	0.4	8	27	216	219	13	168.5	165	130	200	11.5	3.5	1xM25x1.5
100L.	2-8	210	28	M10	60	50	5	0.4	8	31	224	227	11	203	215	180	250	14	4	1xM32x1.5
112M.	2-8	250	28	M10	60	50	5	0.6	8	31	238	241	11	207	215	180	250	14	4	2xM32x1.5
132S.	2-8	293	38	M12	80	70	5	0.6	10	41	285	317	12	248	265	230	300	14	4	2xM32x1.5
132M.	2-8	293	38	M12	80	70	5	0.6	10	41	285	317	12	248	265	230	300	14	4	2xM32x1.5
160M.	2-8	338	42	M16	110	100	5	1	12	45	325	357	20	310	300	250	350	18	5	2xM40x1.5
160L.	2-8	338	42	M16	110	100	5	1	12	45	325	357	20	310	300	250	350	18	5	2xM40x1.5
180M.	2 4-8	355	48	M16	110	100	5	1	14	51.5	335	367	20	351.5	300	250	350	18	5	2xM40x1.5
180L.	2 4-8	355	48	M16	110	100	5	1	14	51.5	335	367	20	370.5	300	250	350	18	5	2xM40x1.5
200L.	2-8	406	55	M20	110	100	5	1.6	16	59	397	397	20	485.5	350	300	400	18	5	2xM50x1.5

Br.Größe 10-11 Brake size			Br.Größe 13-16 Brake size			Br.Größe 19-24 Brake size		
185	134	456	-	-	-	-	-	-
185	134	513	-	-	-	-	-	-
205	134	569	245	164	593	-	-	-
228	134	583	245	164	619	-	-	-
-	-	-	264	164	674	-	-	-
-	-	-	264	164	712	-	-	-
-	-	-	320	164	829	330	215	840
-	-	-	320	164	873	330	215	884
-	-	-	-	-	-	351	215	871 846
-	-	-	-	-	-	351	215	909 884
-	-	-	-	-	-	394	215	1042

<b>FLENDER LOHER</b>				Erstellt Compiled		Letzte Änderung Last change		Drehstrommotor Three-phase motors Typ / type: DBG.-.. Bauform / mounting: IM B5, IM V1, IM V3				Zeichnung-Nr. Drawing No. <b>MLD00-0029</b>		Blatt Sheet		Sprache Language de/en	
Änderungen nur im CAD-E vornehmen.				Datum Date	Name Name	Datum Date	Name Name										
Diese technische Unterlage hat gesetzlichen Schutz (DIN34).		Bearbeitet, Designed		19.06.02	Schietl K.	17.11.03	IMT26KA										
		Geprüft, Checked		19.06.02	IMT2HK	17.11.03	IMT2										
This technical document is proprietary (DIN34).		Teileklasse Classification <b>20501</b>		Bezeichnung Drawing title <b>Maßblatt Dimension sheet</b>				Plotdatum Print date	Plottersteller Printed by	für Abteilung for Department	Plotstatus Print status					Letzter Änd.-Index Last change index <b>d</b>	
																Format DIN A Size DIN A <b>3</b>	



Wahlweise mit Handlüftung  
alternatively with hand release

Flanschlage: Die Anschraubfläche des Flansches liegt  
mit der Kante der Wellenschulter in einer Ebene  
① Lage der Flanschbohrungen ab Flansch-Ø P=450  
② Lage der Flanschbohrungen bis einschl. Flansch-Ø P=400

Paßfeder DIN 6885  
Toleranz für Wellenende bis Ø 28 ISO j6,  
ab Ø 38 ISO k6, über Ø 50 ISO m6  
Toleranz bis N= Ø 250 ISO j6, an N= Ø 300 ISO h6  
Klemmenkasten um je 90° drehbar  
Wahlweise Klemmenkasten EExdIIc  
Für thermische Überwachung Einführung M20x1.5  
3) Ab Baugröße 200 zweiter Klemmenkasten für thermische  
Überwachung auf besondere Bestellung  
Wahlweise Klemmenkasten EExdIIc

Flange-position: The joining-side of the flange is position  
in a straight line with the shaft shoulder  
① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400

Key to DIN 6885  
Shaft end tolerance up to Ø 28 ISO j6,  
up to Ø 38 ISO k6, from Ø 50 ISO m6  
Tolerance up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
Terminal box can be turned 90° in each direction  
Alternatively terminal box EExdIIc  
Cable inlet M20x1.5 for thermal monitoring  
3) From frame size 200 on second terminal box for thermal  
monitoring upon special order  
Alternatively terminal box EExdIIc

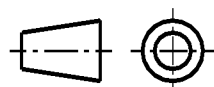
4) Klemmenkasten / Terminal box: EExell  
5) Klemmenkasten / Terminal box: EExdIIc  
6) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

Größe Size	Federdruckbremse Typ 76 Spring-loaded brake type 76					
	10	11	13	16	19	24
M <sub>2N</sub> (Nm)	10	20	50	100	150	270

Br.Größe 10/11 Brake size	Br.Größe 13/16 Brake size			Br.Größe 19/24 Brake size		
	AC	AE	L	AC	AE	L

Baugröße frame size	Polzahl number of poles	A	AA	AB	AF	B	BA	BB	C	D	DB	E	EB	ED	CB	F	GA	H	HA	HD <sup>4)</sup>	HD <sup>5)</sup>	K	KA	LA	LE	M	N	P	S	T	X <sup>6)</sup>
080B.	2-8	125	35	160	-	100	35	130	50	19	M6	40	32	4	0.4	6	21.5	80	10	272	289	9.5	-	10	150	165	130	200	11.5	3.5	1xM25x1.5
090L.	2-8	140	40	180	204	125	40	155	56	24	M8	50	40	5	0.4	8	27	90	13	306	309	10.5	-	13	168.5	165	130	200	11.5	3.5	1xM25x1.5
100L.	2-8	160	45	205	210	140	45	170	63	28	M10	60	50	5	0.4	8	31	100	15	324	327	12	-	11	203	215	180	250	14	4	1xM32x1.5
112M.	2-8	190	50	240	250	140	60	185	70	28	M10	60	50	5	0.6	8	31	112	18	350	353	12	18	11	207	215	180	250	14	4	2xM32x1.5
132S.	2-8	216	50	266	293	140	60	185	89	38	M12	80	70	5	0.6	10	41	132	18	417	449	12	18	12	248	265	230	300	14	4	2xM32x1.5
132M.	2-8	216	50	266	293	178	60	225	89	38	M12	80	70	5	0.6	10	41	132	18	417	449	12	18	12	248	265	230	300	14	4	2xM32x1.5
160M.	2-8	254	60	310	338	210	70	255	108	42	M16	110	100	5	1	12	45	160	25	485	517	15	22	20	310	300	250	350	18	5	2xM40x1.5
160L.	2-8	258	60	310	338	254	70	300	108	42	M16	110	100	5	1	12	45	160	25	485	517	15	22	20	310	300	250	350	18	5	2xM40x1.5
180M.	2-8 4-8	279	70	345	355	241	80	300	121	48	M16	110	100	5	1	14	51.5	180	28	515	547	15	25	20	351.5	300	250	350	18	5	2xM40x1.5
180L.	2-8 4-8	279	70	345	355	279	80	340	121	48	M16	110	100	5	1	14	51.5	180	28	515	547	15	25	20	370.5	300	250	350	18	5	2xM40x1.5
200L.	2-8	318	80	400	406	305	100	365	133	55	M20	110	100	5	1.6	16	59	200	30	597	597	20	26	20	485.5	350	300	400	18	5	2xM50x1.5

FLENDER  
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Erstellt  
Compiled

Letzte Änderung  
Last change

Datum  
Date

Name  
Name

Datum  
Date

Name  
Name

Drehstrommotor  
Three-phase motors  
Typ / type: DBG.-..  
Bauform / mounting: IM B35, IM V15

Zeichnung-Nr.  
Drawing No.

MLD00-0030

Blatt  
Sheet

Sprache  
Language

de/en

Letzter Änd.-Index  
Last change index

d

Format DIN A  
Size DIN A

3

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Geprüft, Checked  
Teileklasse  
Classification 20501

Bezeichnung  
Drawing title Maßblatt  
Dimension sheet

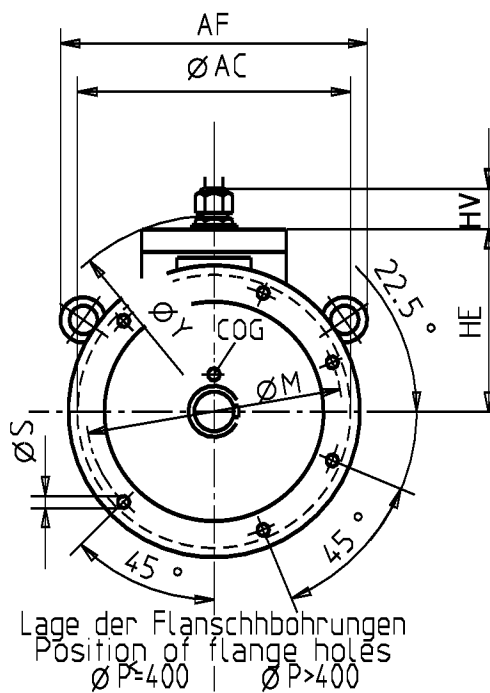
Plotdatum  
Print date

Plotsteller  
Printed by

für Abteilung  
for Department

Plotstatus  
Print status



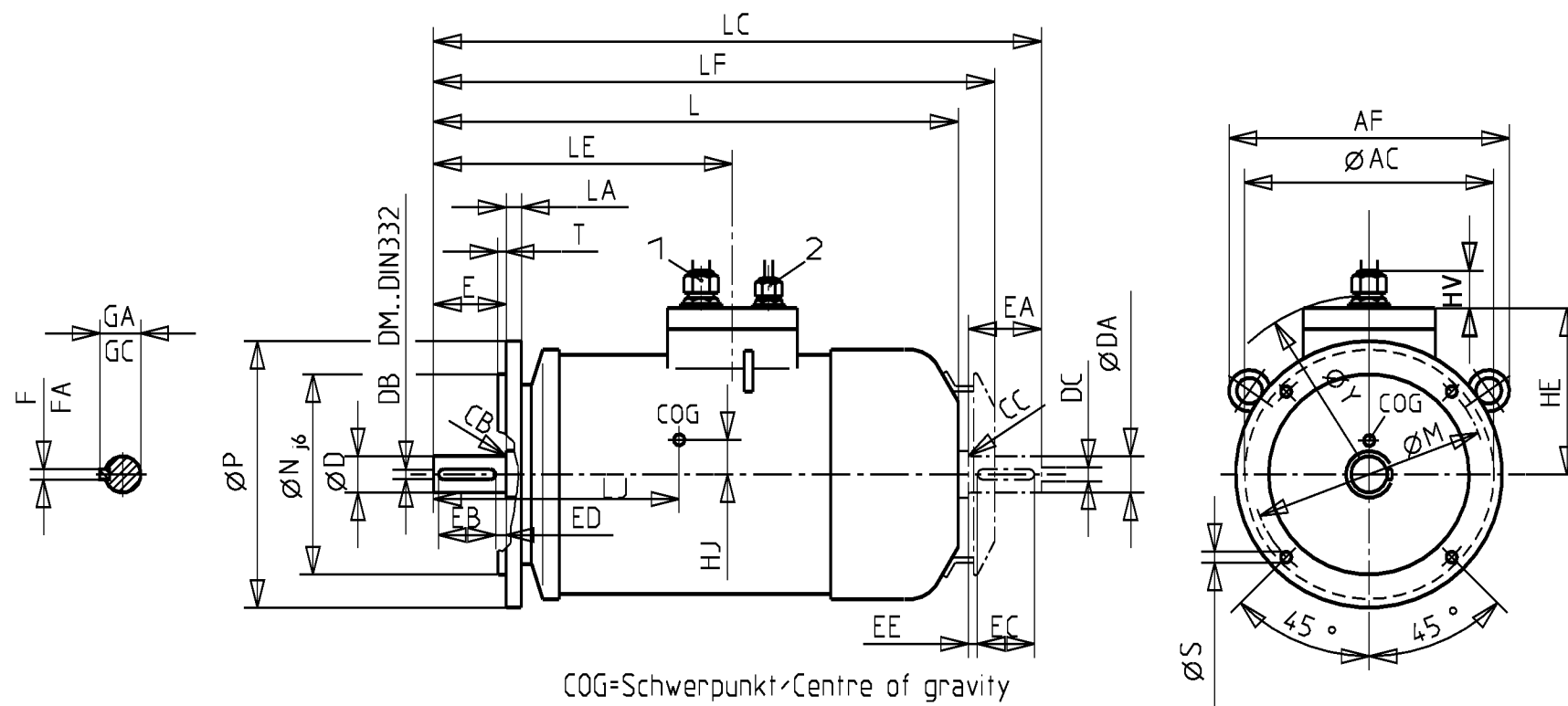


- 1) Cable ..... length due to customer spec.
- 2) Additional cable only for motors with thermal motor protection.

Lage der Flanschbohrungen  
Position of flange holes  
Ø P=400 | Ø P>400

c	WE-Toleranzen ergänzt-Maß EB, ED, CB nachgefr.
b	BG090 u. BG112 neu überarbeitet
a	Fußnote 3) entfernt
Änd.-Index Change index	Änderungs-Bemerkung Description of change

FLENDER LOHER		Erstellt Compiled		Letzte Änderung Last change		Drehstrommotor Three-phase motors Typ / type : DNG./DNS. Bauform / mounting: IM B5, IM V1, IM V3				Zeichnung-Nr. Drawing No.  MLD00-0032		Blatt Sheet	Sprache Language  de/en
		Datum Date	Name Name	Datum Date	Name Name								
Änderungen nur im CAD-E vornehmen.													
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	Geprüft, Checked	18.06.02	IMT2HK										
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COG=Schwerpunkt-Centre of gravity

Passfeder DIN 6885

Toleranz für Wellenende bis  $\varnothing 28$  ISO j6,  
ab  $\varnothing 38$  ISO k6, über  $\varnothing 50$  ISO m6

1) Kabel ..... freie Länge nach Kundenangabe.

2) Zusatzkabel nur bei Motoren mit thermischer Überwachung.

Key to DIN 6885

Shaft end fit up to  $\varnothing 28$  ISO j6,  
up to  $\varnothing 38$  ISO k6, from  $\varnothing 50$  ISO m6

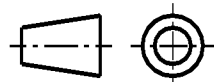
1) Cable ..... length due to customer spec.

2) Additional cable only for motors with thermal  
motor protection.

		Flansch wahlweise Flange optionally											
Baugröße frame size	Polzahl number of poles	LA	M	N	P	S	T	LA	M	N	P	S	T
DNG.-071B.	2-8	15	100	80	120	M6	3	15	130	110	160	M8	3.5
DNG.-080B.	2-8	15	85	70	105	M6	2.5	15	115	95	140	M8	3

Baugröße frame size	Polzahl number of poles	AC	AF	D DA	DB DC	E EA	EB EC	ED EE	CB CC	F FA	GA GC		HE	HJ	L	LA	LC	LE	LF	LJ	M	N	P	S	T	Y	HV	LA	M	N	P	S	T
DNG.-071B.	2-8	151	-	14	M5	30	22	4	0.6	5	16		118	35	261	15	301	135	282	130	85	70	105	M6	2.5	260	37	15	115	95	140	M8	3
DNG.-080B.	2-8	163	-	19	M6	40	32	4	0.4	6	21.5		124	20	308	15	354	150	329	155	100	80	120	M6	3	271	37	10	130	110	160	M8	3.5
DNG.-090L.	2-8	186	200	24	M8	50	40	5	0.4	8	27		135	35	366	13.5	419	168.5	403	181	115	95	140	M8	3	295	37	13.5	130	110	160	M8	3.5
DNG.-100L.	2-8	197	210	28	M10	60	50	5	0.4	8	31		143	30	414	15	484	202.5	454	205	130	110	160	M8	3.5	310	37						
DNG.-112M.	2-8	229	250	28	M10	60	50	5	0.6	8	31		157	25	446	11	517	207	492	222	215	180	250	M12	4	336	37	13	165	130	200	M10	3.5
DNG.-132S.	2-8	260	293	38	M12	80	70	5	0.6	10	41		175	40	495	12	585	258	550	265	265	230	300	M12	4	397	44	18	215	180	250	M12	4
DNG.-132M.	2-8	260	293	38	M12	80	70	5	0.6	10	41		175	34	533	12	623	258	588	285	265	230	300	M12	4	397	44	18	215	180	250	M12	4

**FLENDER  
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Letzte Änderung  
Last change

Datum  
Date

Name  
Name

Datum  
Date

Name  
Name

Drehstrommotor  
Three-phase motors  
Typ / type : DNG.

Bauform / mounting: IM B14, IM V18, IM 19

Zeichnung-Nr.  
Drawing No.

MLD00-0033

Blatt  
Sheet

Sprache  
Language

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19.06.02 Schiestl K. 01.12.03 IMT28BA  
19.06.02 IMT2HK 01.12.03

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Teileklasse  
Classification 20501

Bezeichnung  
Drawing title Maßblatt  
Dimension sheet

Plotdatum  
Print date

Plottersteller  
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Plotstatus  
Print status

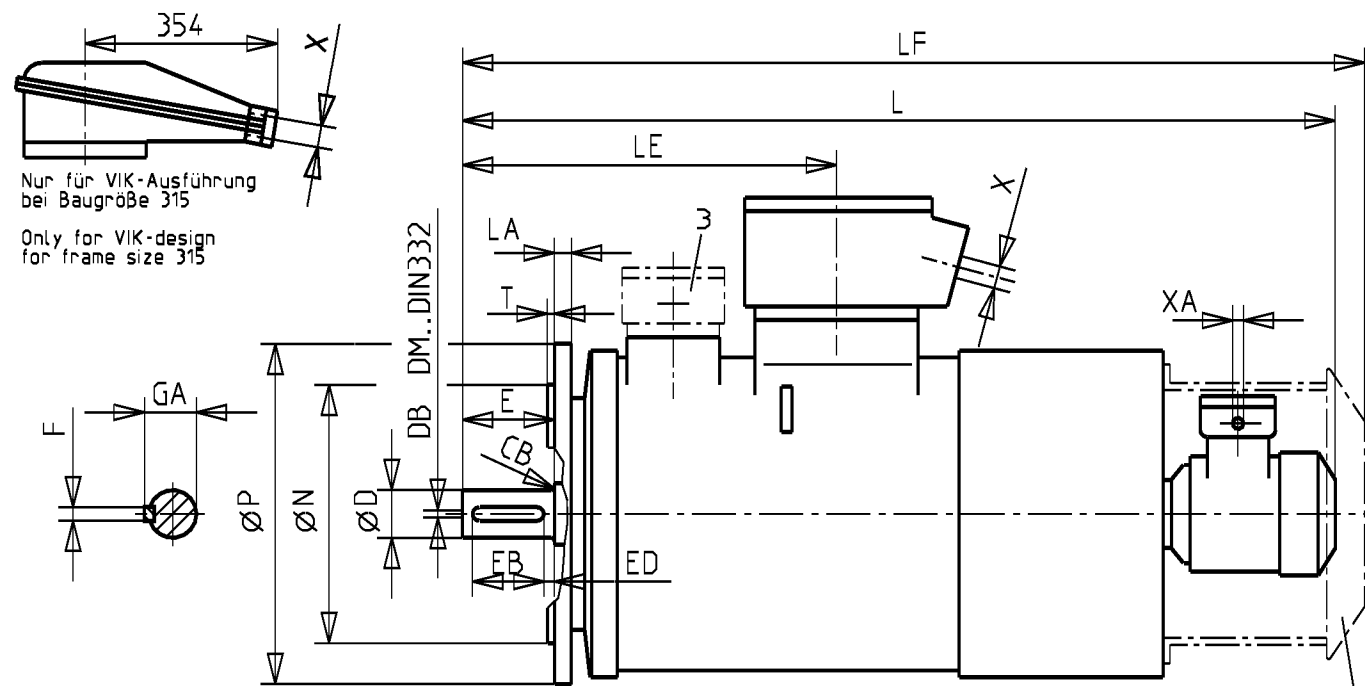
Letzter Änd.-Index  
Last change index

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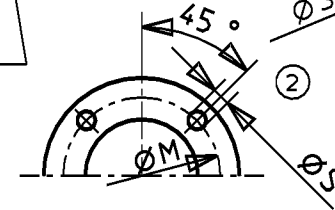
Format DIN A  
Size DIN A

3





Schutzdeckel bei Bauform V1  
Protective cap at Mounting V1



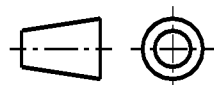
Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
① Lage der Flanschbohrungen ab Flansch- Ø P=450  
② Lage der Flanschbohrungen bis einschl. Flansch- Ø P=400  
Paßfeder DIN 6885  
Toleranz für Wellenende bis Ø 28 ISO j6.  
ab Ø 38 ISO k6, über Ø 50 ISO m6.  
Toleranz bis N= Ø 250 ISO j6, ab N= Ø 300 ISO h6  
Klemmenkasten um je 90° drehbar  
Wahlweise Klemmenkasten EExdIIc  
Für thermische Überwachung Einführung M20x1.5  
3) Ab Baugröße 200 zweiter Klemmenkasten für thermische Überwachung auf besondere Bestellung  
Wahlweise Klemmenkasten EExdIIc

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400  
Key to DIN 6885  
Shaft end tolerance up to Ø 28 ISO j6.  
up to Ø 38 ISO k6, from Ø 50 ISO m6.  
Tolerance up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
Terminal box can be turned 90° in each direction  
Alternatively terminal box EExdIIc  
Cable inlet M20x1.5 for thermal monitoring  
3) From frame size 200 on second terminal box for thermal monitoring upon special order  
Alternatively terminal box EExdIIc

4) Klemmenkasten / Terminal box: EEx e II  
5) Klemmenkasten / Terminal box: EEx d IIc  
6) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	AC	AF	D	DB	E	EB	ED	CB	F	GA	HE 4)	HE 5)	L	LA	LF	LE	M	N	P	S	T	X 6)	Fremdbelüftungsmotor Motor for forced Ventilation	XA 6)		
112M.	2-8	220	249	28	M10	60	50	5	0.6	8	31	238	241	763	11	793	200	215	180	250	14	4	2xM32x1.5	DNG.-071BG-04	1xM25x1.5		
132S.	2-8	260	293	38	M12	80	70	5	0.6	10	41	285	317	780	12	807	248	265	230	300	14	4	2xM32x1.5				
132M.	2-8	260	293	38	M12	80	70	5	0.6	10	41	285	317	818	12	845	248	265	230	300	14	4	2xM32x1.5				
160M.	2-8	312	338	42	M16	110	100	5	1	12	45	325	357	930	20	960	310	300	250	350	18	5	2xM40x1.5				
160L.	2-8	312	338	42	M16	110	100	5	1	12	45	325	357	974	20	1004	310	300	250	350	18	5	2xM40x1.5				
180M.	2-8	344	355	48	M16	110	100	5	1	14	51.5	335	367	971	20	1001	351.5	300	250	350	18	5	2xM40x1.5				
180L.	2-8	344	355	48	M16	110	100	5	1	14	51.5	335	367	1009	20	1039	370.5	300	250	350	18	5	2xM40x1.5				
200L.	2-8	390	406	55	M20	110	100	5	1.6	16	59	397	397	1160	20	1190	485.5	350	300	400	18	5	2xM50x1.5				
225S./M.	2	438	543	55	M20	110	100	5	1.6	16	59	429	429	1211	16	1241	497	400	350	450	18	5	2xM50x1.5				
	4-8			60		140	125	7.5	1.6	18	64			1241		1271	527										
250M.	2	490	475	60	M20	140	125	7.5	1.6	18	64	467	467	1310.5	18	1340.5	535	500	450	550	18	5	2xM63x1.5				
	4-8			65		140	125	7.5	1.6	18	69			1340.5		1340.5	535										
280S.	2	550	550	65	M20	140	125	7.5	1.6	18	69	590	587	1404	18	1434	589	500	450	550	18	5	2xM63x1.5				
	4-8			75		140	125	7.5	1.6	20	79.5			1404		1434	589										
280M.	2	550	550	65	M20	140	125	7.5	1.6	18	69	590	587	1469	18	1499	589	500	450	550	18	5	2xM63x1.5				
	4-8			75		140	125	7.5	1.6	20	79.5			1469		1499	589										
315S.	2	622	570	65	M20	140	125	7.5	1.6	18	69	610	607	1500	22	1540	608	600	550	660	24	6	2xM63x1.5				
	4-8			80		170	140	15	2.5	22	85			1530		1570	638										
315M.	2	622	570	65	M20	140	125	7.5	1.6	18	69	610	607	1620	22	1660	608	600	550	660	24	6	2xM63x1.5				
	4-8			80		170	140	15	2.5	22	85			1650		1690	638										
315L.	2	622	570	65	M20	140	125	7.5	1.6	18	69	663	663	1730	22	1770	653	600	550	660	24	6	2xM63x1.5				
	4-8			80		170	140	15	2.5	22	85			1760		1800	683										

FLENDER  
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Name

Datum  
Date

Name  
Name

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: DNL./DNU.  
Bauform/mounting: IM B5, IM V1, IM V3 DIN 42677

Zeichnung-Nr.  
Drawing No.

MLD00-0035

Blatt  
Sheet

Sprache  
Language

de/en

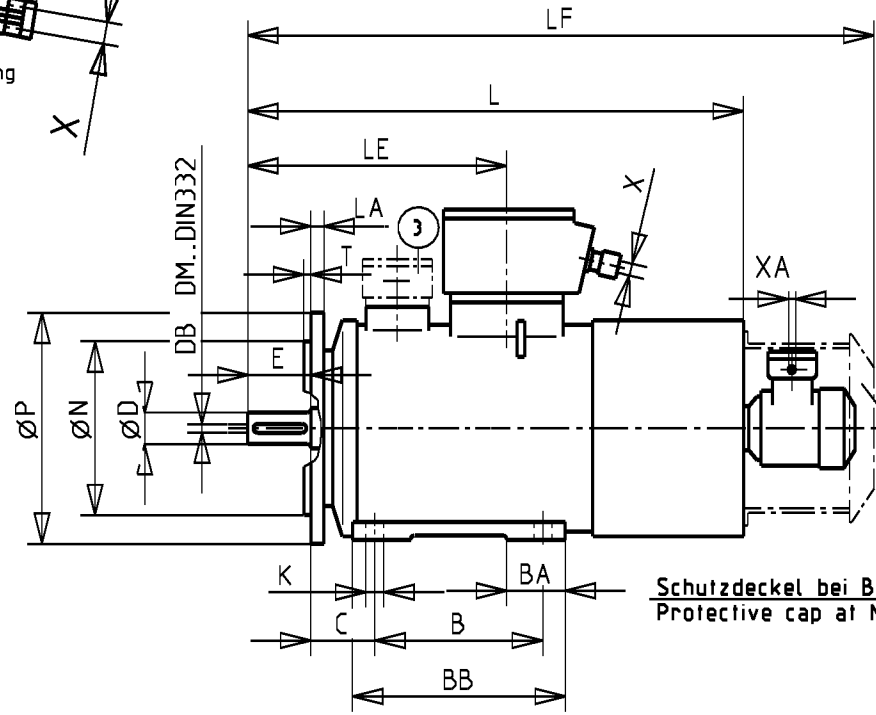
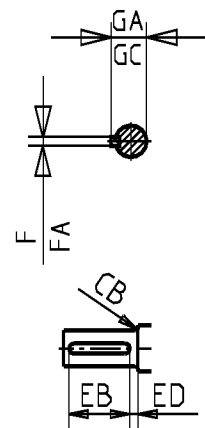
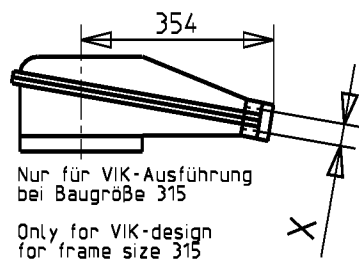
Letzter Änd.-Index  
Last change index

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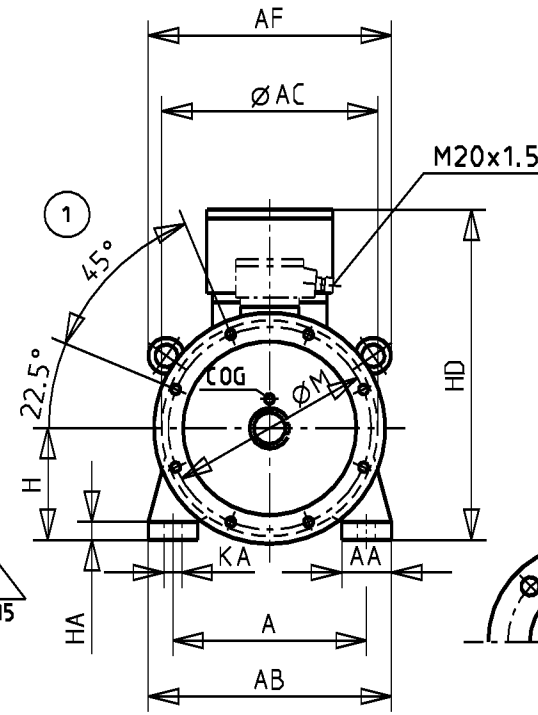
Format DIN A  
Size DIN A

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Schutzdeckel bei Bauform V15  
Protective cap at Mounting V15



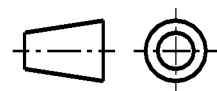
Flanschlage: Die Anschraublfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
① Lage der Flanschbohrungen ab Flansch-  $\varnothing P=450$   
② Lage der Flanschbohrungen bis einschl. Flansch-  $\varnothing P=400$   
Paßfeder DIN 6885  
Toleranz für Wellenende bis  $\varnothing 28$  ISO j6.  
ab  $\varnothing 38$  ISO k6, über  $\varnothing 50$  ISO m6.  
Toleranz bis N=  $\varnothing 250$  ISO j6, ab N=  $\varnothing 300$  ISO h6  
Klemmenkasten um je 90° drehbar  
Wahlweise Klemmenkasten EExdII  
Für thermische Überwachung Einführung M20x1.5  
3) Ab Baugröße 200 zweiter Klemmenkasten für thermische Überwachung auf besondere Bestellung  
Wahlweise Klemmenkasten EExdII

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400  
Key to DIN 6885  
Shaft end tolerance up to  $\varnothing 28$  ISO j6.  
up to  $\varnothing 38$  ISO k6, from  $\varnothing 50$  ISO m6.  
Tolerance up to N=  $\varnothing 250$  ISO j6, from N=  $\varnothing 300$  ISO h6  
Terminal box can be turned 90° in each direction  
Alternatively terminal box EExdII  
Cable inlet M20x1.5 for thermal monitoring  
3) From frame size 200 on second terminal box for thermal monitoring upon special order  
Alternatively terminal box EExdII

4) Klemmenkasten / Terminal box: EEx e II  
5) Klemmenkasten / Terminal box: EEx d II  
6) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

Baugr. frame size	Polzahl number of poles	A	AA	AB	AC	AF	B	BA	BB	C	D DA	DB DC	E	EB	ED	CB	F FA	GA GC	H	HA	HD <sup>4)</sup>	HD <sup>5)</sup>	K	KA	L	LA	LE	LF	M	N	P	S	T	X <sup>6)</sup>	Fremdbel. Motor Motor for forced Ventilation	XA <sup>6)</sup>
112M.	2-8	190	50	240	220	249	140	60	185	70	28	M10	60	50	5	0.6	8	31	112	18	350	353	12	18	689	11	200	716	215	180	250	14	4	2xM32x1.5	DNG.-071BG-04	M20x1.5
132S.	2-8	216	50	260	270	263	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	18	390	456	12	18	753	12	248	783	265	230	300	14	4	2xM32x1.5		
132M.	2-8	216	50	260	270	263	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	18	390	456	12	18	791	12	248	821	265	230	300	14	4	2xM32x1.5		
160M.	2-8	254	60	310	314	312	210	60	255	108	42	M16	110	100	5	1	12	45	160	25	448	514	15	22	892	20	310	922	300	250	350	18	5	2xM40x1.5		
160L.	2-8	254	60	310	314	312	254	60	299	108	42	M16	110	100	5	1	12	45	160	25	448	514	15	22	936	20	310	966	300	250	350	18	5	2xM40x1.5		
180M.	2-8	279	70	345	344	355	241	80	300	121	48	M16	110	100	5	1	14	51.5	180	28	515	547	15	25	971	20	351.5	1001	300	250	350	18	5	2xM40x1.5		
180L.	2-8	279	70	345	344	355	279	80	340	121	48	M16	110	100	5	1	14	51.5	180	28	515	547	15	25	1009	20	370.5	1039	300	250	350	18	5	2xM40x1.5		
200L.	2-8	318	80	400	390	406	305	100	365	133	55	M20	110	100	5	1.6	16	59	200	30	597	597	20	26	1160	20	485.5	1190	350	300	400	18	5	2xM50x1.5		
225S.	2 4-8	356	90	450	438	543	286	110	370	149	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	225	32	654	654	20	26	1211 1241	16	497 527	1241 1271	400	350	450	18	5	2xM50x1.5		
225M.	2 4-8	356	90	450	438	543	311	110	395	149	55 60	M20	110 140	100 125	5 7.5	1.6	16 18	59 64	225	32	654	654	20	26	1211 1241	16	497 527	1241 1271	400	350	450	18	5	2xM50x1.5		
250M.	2 4-8	406	100	505	490	475	349	110	420	168	60 65	M20	140	125	7.5	1.6	18	64 69	250	35	717	717	26	38	1310.5	18	535	1340.5	500	450	550	18	5	2xM63x1.5		
280S.	2 4-8	457	110	570	550	550	368	120	470	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	870	867	26	38	1404	18	589	1434	500	450	550	18	5	2xM63x1.5		
280M.	2 4-8	457	110	570	550	550	419	120	520	190	65 75	M20	140	125	7.5	1.6	18 20	69 79.5	280	40	870	867	26	38	1469	18	589	1499	500	450	550	18	5	2xM63x1.5		
315S.	2 4-8	508	120	630	622	570	406	130	520	216	65 80	M20	140 170	125 140	7.5 15	1.6 2.5	18 22	69 85	315	30	925	922	28	-	1509 1539	22	608 638	1539 1569	600	550	660	24	6	2xM63x1.5	DNG.-080BH-04	M25x1.5
315M.	2 4-8	508	120	630	622	570	457	130	570	216	65 80	M20	140 170	125 140	7.5 15	1.6 2.5	18 22	69 85	315	30	925	922	28	-	1629 1659	22	608 638	1659 1689	600	550	660	24	6	2xM63x1.5		
315L.	2 4-8	508	120	630	622	570	508	130	621	216	65 80	M20	140 170	125 140	7.5 15	1.6 2.5	18 22	69 85	315	30	978	978	28	-	1739 1769	22	653 683	1769 1799	600	550	660	24	6	2xM63x1.5		

FLENDER  
LOHER



Erstellt  
Compiled

Letzte Änderung  
Last change

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: DNL./DNU.  
Bauform/mounting: IM B35, V15

Zeichnung-Nr.  
Drawing No.  
MLD00-0036

Blatt  
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Sprache  
Language  
de/en

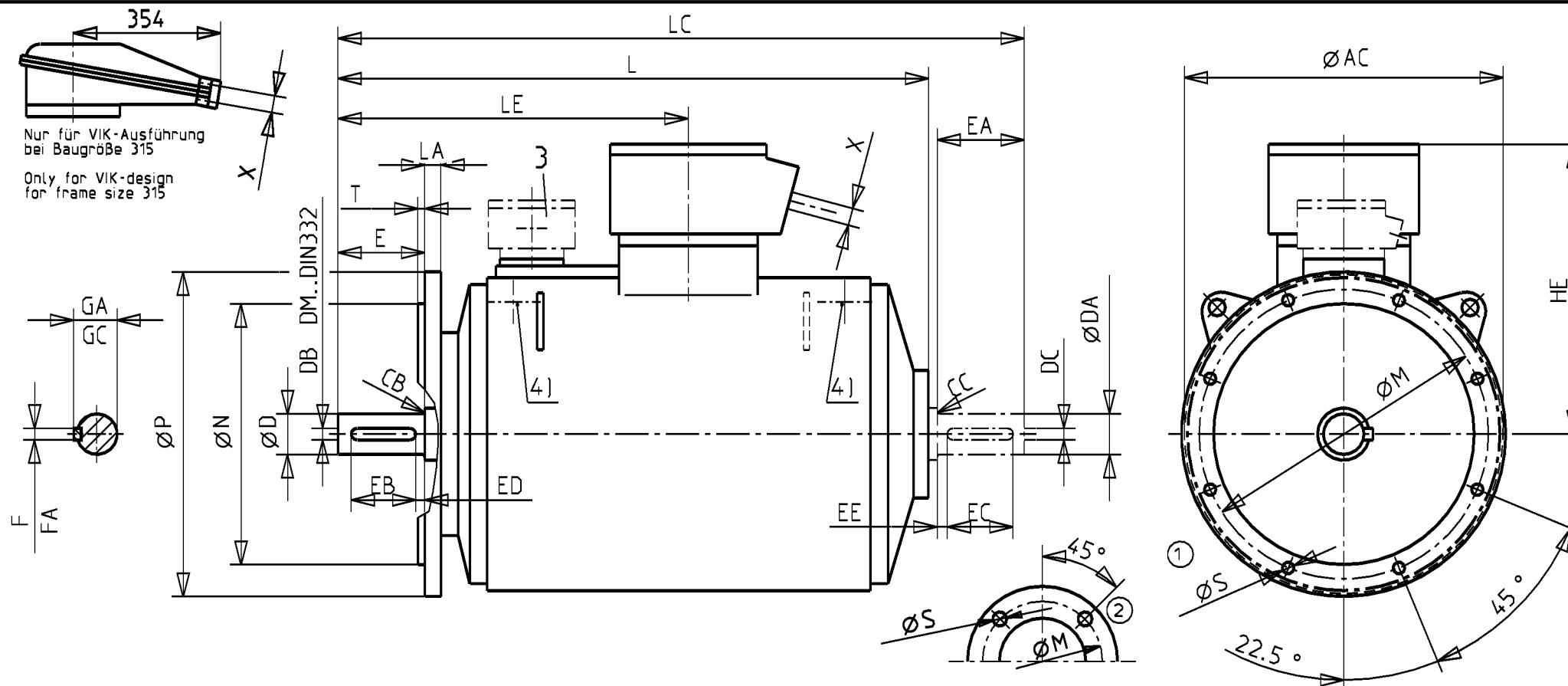
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Teileklasse  
Classification  
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Bezeichnung  
Drawing title  
Maßblatt  
Dimension sheet

Plotdatum  
Print date  
Plottersteller  
Printed by  
für Abteilung  
for Department  
Plotstatus  
Print status

Letzter Änd.-Index  
Last change index  
Format DIN A  
Size DIN A  
3







Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
 ① Lage der Flanschbohrungen ab Flansch- Ø P=450  
 ② Lage der Flanschbohrungen bis einschl. Flansch- Ø P=400

Paßfeder DIN 6885  
 Toleranz für Wellenende bis Ø 28 ISO j6.  
 ab Ø 38 ISO k6, über Ø 50 m6.  
 Toleranz bis N= Ø 250 ISO j6, ab N= Ø 300 ISO h6  
 Klemmenkasten um je 90° drehbar  
 Wahlweise Klemmenkasten EEx d IIC  
 Für thermische Überwachung Einführung M20x1.5  
 ③ Ab Baugröße 200 zweiter Klemmenkasten für thermische Überwachung auf besondere Bestellung  
 Wahlweise Klemmenkasten EEx d IIC  
 4) Kühlwasser-Zulauf/ Kühlwasser-Ablauf kann vertauscht werden

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
 ① position of flange-holes from flange-diameter P=450  
 ② position of flange-holes up to flange-diameter P=400

Key to DIN 6885  
 Shaft and tolerance up to Ø 28 ISO j6.  
 up to Ø 38 ISO k6, from Ø 50 ISO m6  
 Tolerance up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
 Terminal box can be turned 90° in each direction  
 Alternatively terminal box EEx d IIC  
 Cable inlet M20x1.5 for thermal monitoring  
 ③ From frame size 200 on second terminal box for thermal monitoring upon special order  
 Alternatively terminal box EEx d IIC  
 4) Cooling-water entry and cooling-water exit can be exchanged

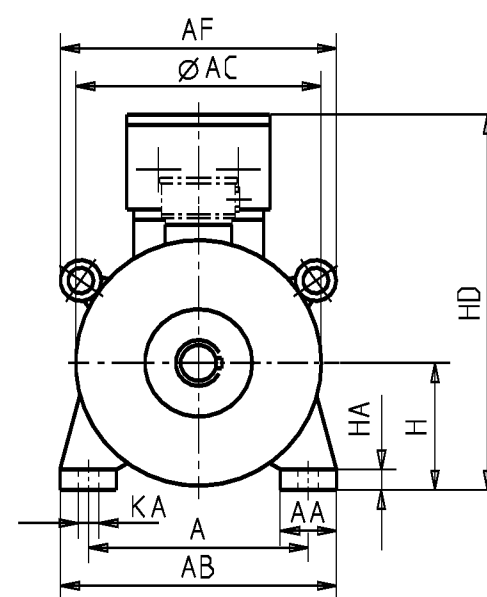
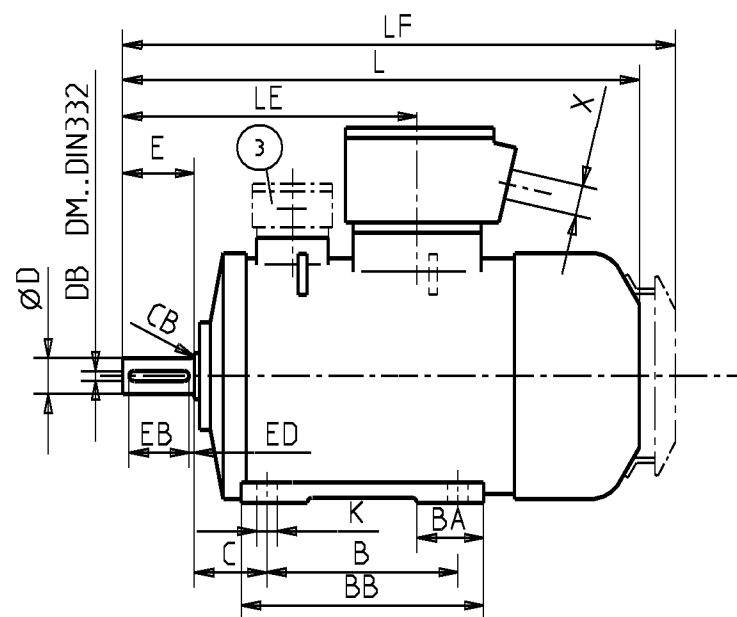
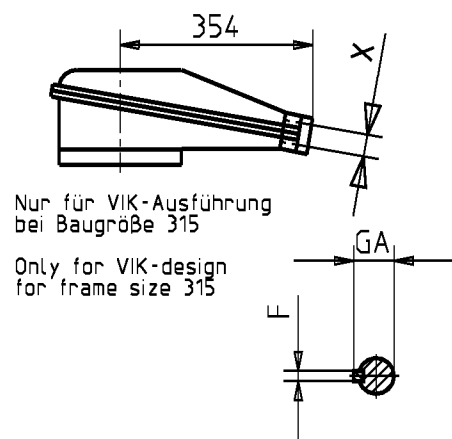
5) Klemmenkasten / Terminal box: EEx e II  
 6) Klemmenkasten / Terminal box: EEx d IIC

7) Abweichende Gewindegrößen nach Kunden-Auftrag  
 Other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	AC	D DA	DB DC	E EA	EB EC	ED EE	CB CC	F FA	GA GC	HE <sub>51</sub>	HE <sub>61</sub>	L	LA	LC	LE	M	N	P	S	T	X 71
DNW.-160M.	2-8	296	42	M16	110	100	5	1	12	45	288	354	558	20	676	310	300	250	350	18	5	2xM40x1.5
DNW.-160L.	2-8	296	42	M16	110	100	5	1	12	45	288	354	602	20	720	310	300	250	350	18	5	2xM40x1.5
DNW.-180M.	2-8	328	48	M16	110	100	5	1	14	51.5	352	384	586	20	704	352	300	250	350	18	5	2xM40x1.5
DNW.-180L.	2-8	328	48	M16	110	100	5	1	14	51.5	352	384	624	20	742	371	300	250	350	18	5	2xM40x1.5
DNW.-200L.	2-8	375	55	M20	110	100	5	1.6	16	59	416	416	730	20	850	485.5	350	300	400	18	5	2xM50x1.5
DNW.-225S.-M.	2	406	55	M20	110	100	5	1.6	16	59	456	456	771	16	896	497	400	350	450	18	5	2xM50x1.5
	4-8		60		140	125	7.5	1.6	18	64			801		956	527						
DNW.-250M.	2	468	60	M20	140	125	7.5	1.6	18	64	485	485	840	18	990	535	500	450	550	18	5	2xM50x1.5
	4-8		65		140	125	7.5	1.6	18	69			847		1005	535						
DNW.-280S.	2	514	65	M20	140	125	7.5	1.6	18	69	591	589	902	18	1070	589	500	450	550	18	5	2xM63x1.5
	4-8		75		140	125	7.5	1.6	20	79.5			910		1080	589						
DNW.-280M.	2	514	65	M20	140	125	7.5	1.6	18	69	591	589	967	18	1135	589	500	450	550	18	5	2xM63x1.5
	4-8		75		140	125	7.5	1.6	20	79.5			975		1145	589						
DNW.-315S.	2	585	65	M20	140	125	7.5	1.6	18	69	627	625	970	22	1125	672	600	550	660	24	6	2xM63x1.5
	4-8		80		170	140	15	2.5	22	85			1020		1205	702						
DNW.-315M.	2	585	65	M20	140	125	7.5	1.6	18	69	627	625	1090	22	1245	672	600	550	660	24	6	2xM63x1.5
	4-8		80		170	140	15	2.5	22	85			1140		1325	702						
DNW.-315L.	2	585	65	M20	140	125	7.5	1.6	18	69	681	677	1200	22	1355	702	600	550	660	24	6	2xM63x1.5
	4-8		80		170	140	15	2.5	22	85			1250		1435	732						

WE-Toleranzen ergänzt-Maß EB, ED, CB nachgefr.  
 Baugr. 180 nachgetragen  
 Fußnote 71 bei X hinzu  
 Änderung-Bemerkung  
 Description of change  
 c b a  
 Änderung-Index  
 Change index

<b>FLENDER LOHER</b> Änderungen nur im CAD-E vornehmen.				Erstellt Compiled Datum Name Date Name		Letzte Änderung Last change Datum Name Date Name		Drehstrommotor Three-phase motors Typ/type: DNW.-.. Bauform / mounting: IM B5, IM V1, IM V3				Zeichnung-Nr. Drawing No. <b>MLD00-0038</b>		Blatt Sheet		Sprache Language de/en	
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Teileklasse Classification <b>20501</b>				Bezeichnung Drawing title <b>Maßblatt Dimension sheet</b>												Letzter Änd.-Index Last change index <b>c</b>	
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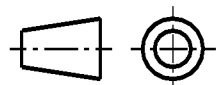
Paßfeder DIN 6885  
Toleranz für Wellenende bis Ø 28 ISO j6,  
ab Ø 38 ISO k6, über Ø 50 ISO m6.  
Klemmenkasten um je 90° drehbar  
Wahlweise Klemmenkasten EEx d IIC  
Für thermische Überwachung Einführung M20x1.5  
③ Ab Baugröße 200 zweiter Klemmenkasten für thermische  
Überwachung auf besondere Bestellung  
Wahlweise Klemmenkasten EEx d IIC

Key to DIN 6885  
Shaft end tolerance up to Ø 28 ISO j6,  
up to Ø 38 ISO k6, from Ø 50 ISO m6.  
Terminal box can be turned 90° in each direction  
Alternatively terminal box EEx d IIC  
Cable inlet M20x1.5 for thermal monitoring  
③ From frame size 200 on second terminal box for thermal  
monitoring upon special order  
Alternatively terminal box EEx d IIC

1) Klemmenkasten / Terminal box: EEx e II  
2) Klemmenkasten / Terminal box: EEx d IIC  
4) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	AF	B	BA	BB	C	D	DB	E	EB	ED	CB	F	GA	H	HA	HD <sup>1)</sup>	HD <sup>2)</sup>		K	KA	L		LE	LF		X <sup>4)</sup>
132S.	2	216	50	260	270	263	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	18	390	456		12	18	563		248	723		2xM32x1.5
132M.	2	216	50	260	270	263	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	18	390	456		12	18	601		248	761		2xM32x1.5
160M.	2	254	60	310	314	312	210	60	255	108	42	M16	110	100	5	1	12	45	160	25	448	514		15	22	710		310	893		2xM40x1.5
160L.	2	254	60	310	314	312	254	60	299	108	42	M16	110	100	5	1	12	45	160	25	448	514		15	22	755		310	935		2xM40x1.5
180M.	2	279	70	345	344	355	241	80	300	121	48	M16	110	100	5	1	14	51.5	180	28	525	547		15	25	740		351.5	922		2xM40x1.5
180L.	2	279	70	345	344	355	279	80	340	121	48	M16	110	100	5	1	14	51.5	180	28	525	547		15	25	778		370.5	961		2xM40x1.5
200L.	2	318	80	400	390	406	305	100	365	133	55	M20	110	100	5	1.6	16	59	200	30	597	597		20	26	924		485.5	1106		2xM50x1.5
225S.	2	356	90	450	438	543	286	110	370	149	55	M20	110	100	5	1.6	16	59	225	32	654	654		20	26	974		497	1227		2xM50x1.5
225M.	2	356	90	450	438	543	311	110	395	149	55	M20	110	100	5	1.6	16	59	225	32	654	654		20	26	974		497	1227		2xM50x1.5
250M.	2	406	100	505	490	475	349	110	420	168	60	M20	140	125	7.5	1.6	18	64	250	35	717	717		26	38	1080		535	1243		2xM63x1.5
280S.	2	457	110	570	550	550	368	120	470	190	65	M20	140	125	7.5	1.6	18	69	280	40	870	867		26	38	1118		589	1380		2xM63x1.5
280M.	2	457	110	570	550	550	419	120	520	190	65	M20	140	125	7.5	1.6	18	69	280	40	870	867		26	38	1188		589	1450		2xM63x1.5
315S.	2	508	120	630	622	570	406	130	520	216	65	M20	140	125	7.5	1.6	18	69	315	30	925	922		Ø28	-	1256		608	1504		2xM63x1.5
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**FLENDER  
LOHER**



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Letzte Änderung  
Last change

Datum  
Date

Name  
Name

Datum  
Date

Name  
Name

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: DNG, DNS. Geräuschgüte 3, Noise grade 3  
Bauform/mounting: IM B3, IM V5, IM V6 DIN 42673

Zeichnung-Nr.  
Drawing No.

MLD00-0061

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Dimension sheet

Plotdatum  
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Plottersteller  
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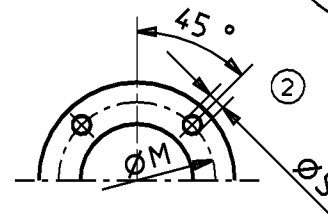
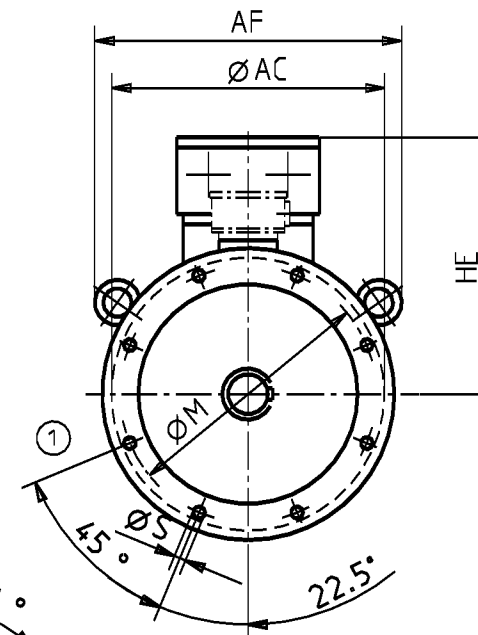
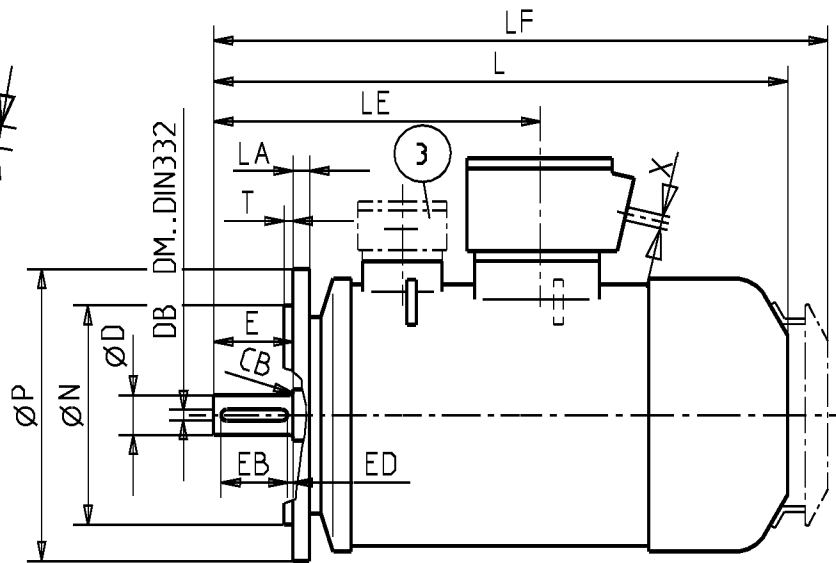
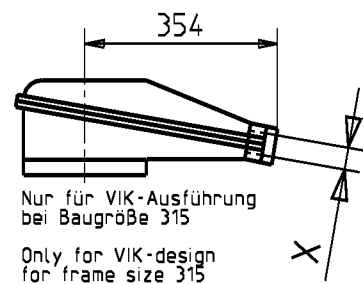
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Last change index

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Format DIN A  
Size DIN A

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Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
① Lage der Flanschbohrungen ab Flansch- Ø P=450  
② Lage der Flanschbohrungen bis einschl. Flansch- Ø P=400  
Paßfeder DIN 6885  
Toleranz für Wellenende bis Ø 28 ISO j6.  
ab Ø 38 ISO k6, über Ø 50 ISO m6.  
Toleranz bis N= Ø 250 ISO j6, ab N= Ø 300 ISO h6  
Klemmenkasten um je 90° drehbar  
Wahlweise Klemmenkasten EEx d IIC  
Für thermische Überwachung Einführung M20x1.5  
③ Ab Baugröße 200 zweiter Klemmenkasten für thermische Überwachung auf besondere Bestellung  
Wahlweise Klemmenkasten EEx d IIC

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
① position of flange-holes from flange-diameter P=450  
② position of flange-holes up to flange-diameter P=400

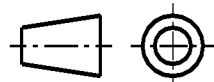
Key to DIN 6885  
Shaft end tolerance up to Ø 28 ISO j6.  
up to Ø 38 ISO k6, from Ø 50 ISO m6.  
Tolerance up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
Terminal box can be turned 90° in each direction  
Alternatively terminal box EEx d IIC  
Cable inlet M20x1.5 for thermal monitoring  
③ From frame size 200 on second terminal box for thermal monitoring upon special order  
Alternatively terminal box EEx d IIC

4) Klemmenkasten / Terminal box: EEx e II  
5) Klemmenkasten / Terminal box: EEx d IIC

6) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	AC	AF	D	DB	E	EB	ED	CB	F	GA	HE <sup>4)</sup>	HE <sup>5)</sup>		L	LA		LE	LF		M	N	P	S	T	X <sup>6)</sup>
132S.	2	270	263	38	M12	80	70	5	0.6	10	41	258	324		563	12		248	723		265	230	300	14	4	2xM32x1.5
132M.	2	270	263	38	M12	80	70	5	0.6	10	41	258	324		601	12		248	761		265	230	300	14	4	2xM32x1.5
160M.	2	314	312	42	M16	110	100	5	1	12	45	288	354		701	20		310	893		300	250	350	18	5	2xM40x1.5
160L.	2	314	312	42	M16	110	100	5	1	12	45	288	354		755	20		310	935		300	250	350	18	5	2xM40x1.5
180M.	2	344	355	48	M16	110	100	5	1	14	51.5	335	367		740	20		351.5	922		300	250	350	18	5	2xM40x1.5
180L.	2	344	355	48	M16	110	100	5	1	14	51.5	335	367		778	20		370.5	961		300	250	350	18	5	2xM40x1.5
200L.	2	390	406	55	M20	110	100	5	1.6	16	59	397	397		924	20		485.5	1106		350	300	400	18	5	2xM50x1.5
225S./M.	2	438	543	55	M20	110	100	5	1.6	16	59	429	429		974	16		497	1227		400	350	450	18	5	2xM50x1.5
250M.	2	490	475	60	M20	140	125	7.5	1.6	18	64	467	467		1080	18		535	1243		500	450	550	18	5	2xM63x1.5
280S.	2	550	550	65	M20	140	125	7.5	1.6	18	69	590	587		1118	18		589	1380		500	450	550	18	5	2xM63x1.5
280M.	2	550	550	65	M20	140	125	7.5	1.6	18	69	590	587		1188	18		589	1450		500	450	550	18	5	2xM63x1.5
315S.	2	622	570	65	M20	140	125	7.5	1.6	18	69	610	607		1256	22		608	1504		600	550	660	24	6	2xM63x1.5
315M.	2	622	570	65	M20	140	125	7.5	1.6	18	69	610	607		1376	22		608	1624		600	550	660	24	6	2xM63x1.5
315L.	2	622	570	65	M20	140	125	7.5	1.6	18	69	663	663		1486	22		653	1734		600	550	660	24	6	2xM63x1.5

FLENDER  
LOHER



Erstellt  
Compiled

Letzte Änderung  
Last change

Datum  
Date

Name  
Name

Datum  
Date

Name  
Name

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: DNG./DNS. Geräuschgüte 3, Noise grade 3  
Bauform/mounting: IM B5, IM V1, IM V3 DIN 42677

Zeichnung-Nr.  
Drawing No.

MLD00-0062

Blatt  
Sheet

1

Sprache  
Language

de/en

Diese technische Unterlage hat  
gesetzlichen Schutz (DIN34).

Bearbeitet, Designed  
Geprüft, Checked

30.08.02 IMT25JA 02.12.03 IMT25JA  
30.08.02 IMT2HK

This technical document  
is proprietary (DIN34).

Teileklasse  
Classification 20501

Bezeichnung  
Drawing title Maßblatt  
Dimension sheet

Plotdatum  
Print date

Plottersteller  
Printed by

für Abteilung  
for Department

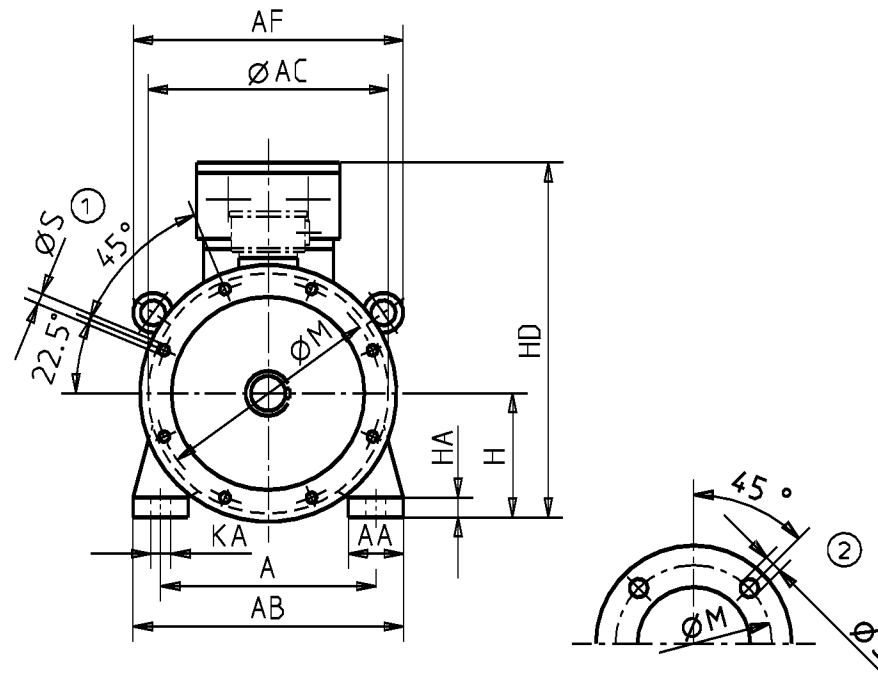
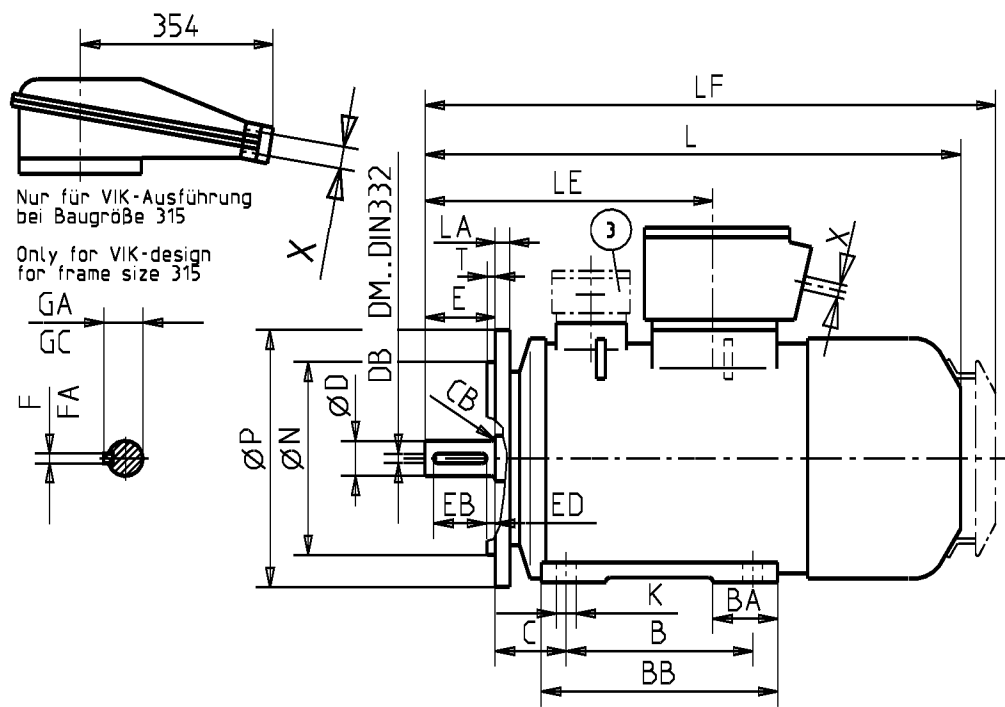
Plotstatus  
Print status

Letzter Änd.-Index  
Last change index

b

Format DIN A  
Size DIN A

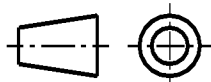
3



Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
 ① Lage der Flanschbohrungen ab Flansch- Ø P=450  
 ② Lage der Flanschbohrungen bis einschl. Flansch- Ø P=400  
 Paßfeder DIN 6885  
 Toleranz für Wellenende bis Ø 28 ISO j6,  
 ab Ø 38 ISO k6, über Ø 50 ISO m6  
 Toleranz bis N= Ø 250 ISO j6, ab N= Ø 300 ISO h6  
 Klemmenkasten um je 90° drehbar  
 Wahlweise Klemmenkasten EEx d IIC  
 Für thermische Überwachung Einführung M20x1.5  
 ③ Ab Baugröße 200 zweiter Klemmenkasten für thermische Überwachung auf besondere Bestellung  
 Wahlweise Klemmenkasten EEx d IIC  
 Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
 ① position of flange-holes from flange-diameter P=450  
 ② position of flange-holes up to flange-diameter P=400  
 Key to DIN 6885  
 Shaft end tolerance up to Ø 28 ISO j6,  
 up to Ø 38 ISO k6, from Ø 50 ISO m6  
 Tolerance up to N= Ø 250 ISO j6, from N= Ø 300 ISO h6  
 Terminal box can be turned 90° in each direction  
 Alternatively terminal box EEx d IIC  
 Cable inlet M20x1.5 for thermal monitoring  
 ③ From frame size 200 on second terminal box for thermal monitoring upon special order  
 Alternatively terminal box EEx d IIC  
 4) Klemmenkasten / Terminal box: EEx e II  
 5) Klemmenkasten / Terminal box: EEx d IIC  
 6) Abweichende Gewindegrößen nach Kunden-Auftrag  
 Other thread sizes acc. customer order

Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	AF	B	BA	BB	C	D	DB	E	EB	ED	CB	F	GA	H	HA	HD <sup>4)</sup>	HD <sup>5)</sup>		K	KA	L	LA		LE	LF		M	N	P	S	T	X <sup>6)</sup>
132S.	2	216	50	260	270	263	140	50	185	89	38	M12	80	70	5	0.6	10	41	132	18	390	456		12	18	563	12		248	723		265	230	300	14	4	2xM32x1.5
132M.	2	216	50	260	270	263	178	50	223	89	38	M12	80	70	5	0.6	10	41	132	18	390	456		12	18	601	12		248	761		265	230	300	14	4	2xM32x1.5
160M.	2	254	60	310	314	312	210	60	255	108	42	M16	110	100	5	1	12	45	160	25	448	514		15	22	710	20		310	893		300	250	350	18	5	2xM40x1.5
160L.	2	254	60	310	314	312	254	60	299	108	42	M16	110	100	5	1	12	45	160	25	448	514		15	22	755	20		310	935		300	250	350	18	5	2xM40x1.5
180M.	2	279	70	345	344	355	241	80	300	121	48	M16	110	100	5	1	14	51.5	180	28	515	547		15	25	740	20		351.5	922		300	250	350	18	5	2xM40x1.5
180L.	2	279	70	345	344	355	279	80	340	121	48	M16	110	100	5	1	14	51.5	180	28	515	547		15	25	778	20		370.5	961		300	250	350	18	5	2xM40x1.5
200L.	2	318	80	400	390	406	305	100	365	133	55	M20	110	100	5	1.6	16	59	200	30	597	597		20	26	924	20		485.5	1106		350	300	400	18	5	2xM50x1.5
225S.	2	356	90	450	438	543	286	110	370	149	55	M20	110	100	5	1.6	16	59	225	32	654	654		20	26	974	16		497	1227		400	350	450	18	5	2xM50x1.5
225M.	2	356	90	450	438	543	311	110	395	149	55	M20	110	100	5	1.6	16	59	225	32	654	654		20	26	974	16		497	1227		400	350	450	18	5	2xM50x1.5
250M.	2	406	100	505	490	475	349	110	420	168	60	M20	140	125	7.5	1.6	18	64	250	35	717	717		26	38	1080	18		535	1243		500	450	550	18	5	2xM63x1.5
280S.	2	457	110	570	550	550	368	120	470	190	65	M20	140	125	7.5	1.6	18	69	280	40	870	867		26	38	1118	18		589	1380		500	450	550	18	5	2xM63x1.5
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315S.	2	508	120	630	622	570	406	130	520	216	65	M20	140	125	7.5	1.6	18	69	315	30	925	922		28	-	1256	22		608	1504		600	550	660	24	6	2xM63x1.5
315M.	2	508	120	630	622	570	457	130	570	216	65	M20	140	125	7.5	1.6	18	69	315	30	925	922		28	-	1376	22		608	1624		600	550	660	24	6	2xM63x1.5
315L.	2	508	120	630	622	570	508	130	621	216	65	M20	140	125	7.5	1.6	18	69	315	30	978	978		28	-	1486	22		653	1734		600	550	660	24	6	2xM63x1.5

**FLENDER  
LOHER**



Erstellt  
Compiled

Letzte Änderung  
Last change

Datum  
Date

Name  
Name

Datum  
Date

Name  
Name

Drehstrommotoren mit Käfigläufer  
Three-phase motors with squirrel cage-rotor  
Typ/type: DNG./DNS.  
Bauform/mounting: IM B35, IM V15, IM V36 DIN42673 + DIN42677

Zeichnung-Nr.  
Drawing No.

**MLD00-0063**

Blatt  
Sheet

Sprache  
Language

de/en

Änd.-Index  
Change index

Bearbeitet, Designed  
Geprüft, Checked

03.12.03 IMT25JA

Teileklasse  
Classification

**20501**

Bezeichnung  
Drawing title

**Maßblatt  
Dimension sheet**

Plotdatum  
Print date

Plottersteller  
Printed by

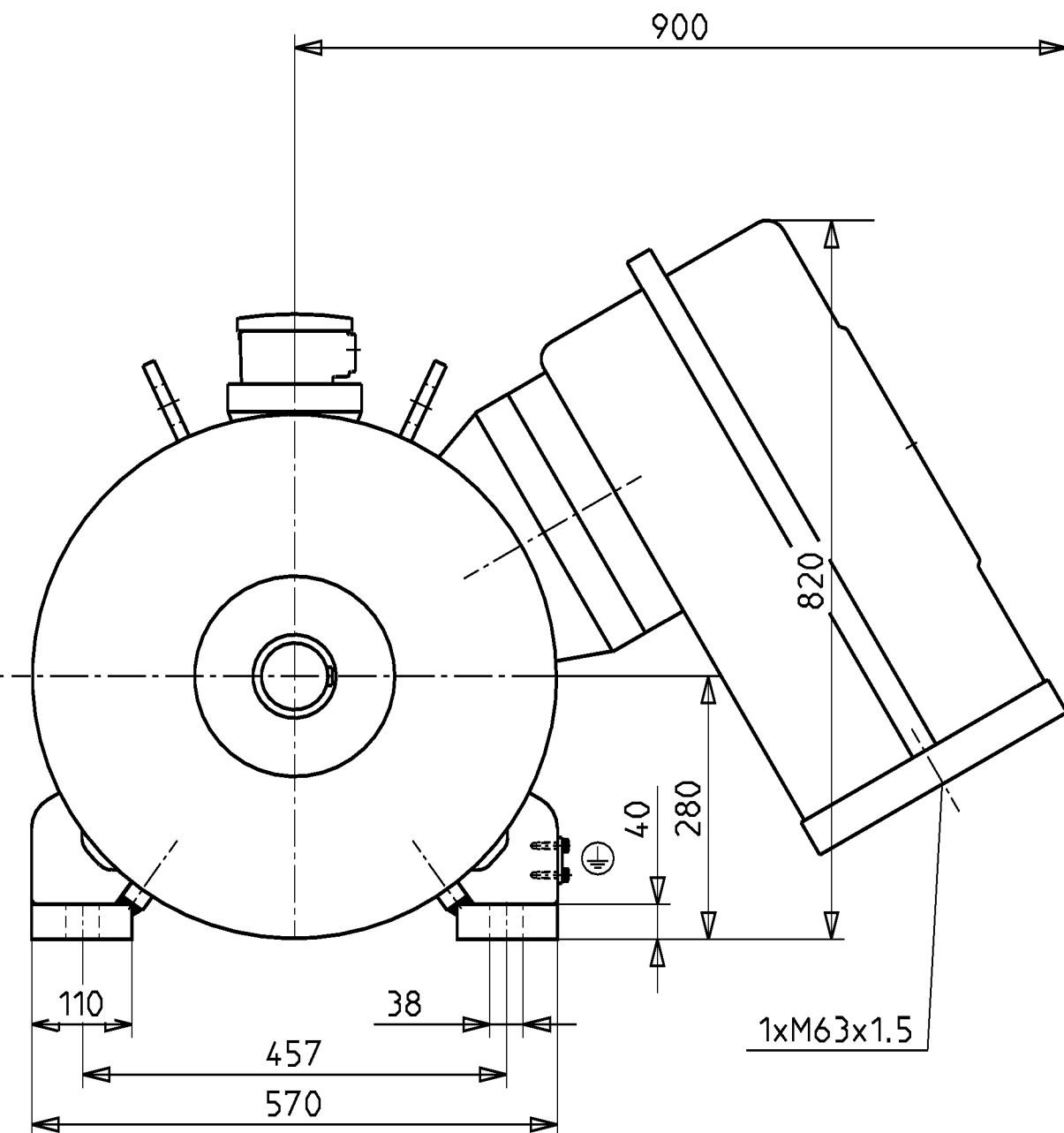
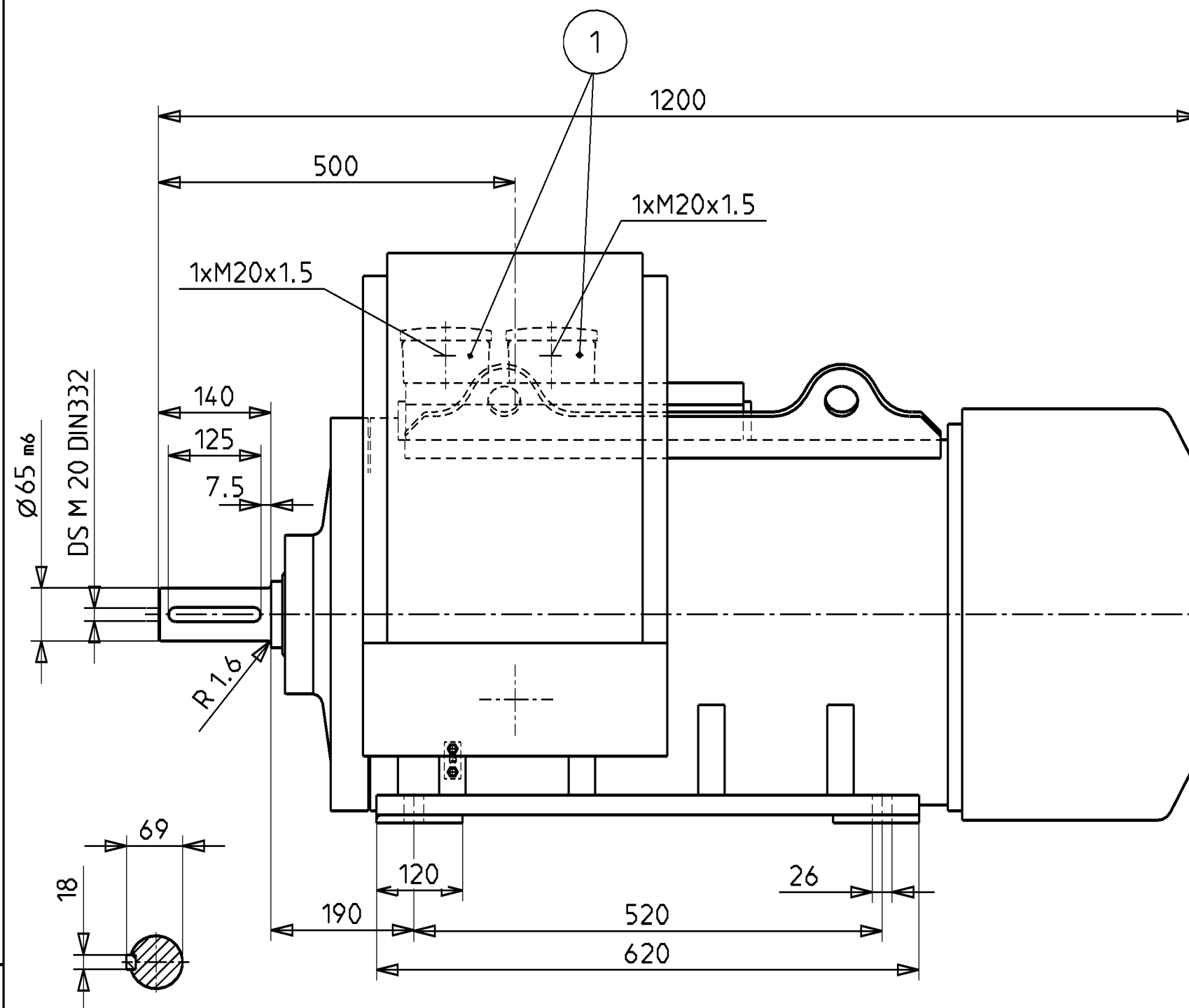
für Abteilung  
for Department

Plotstatus  
Print status

Letzter Änd.-Index  
Last change index

Format DIN A  
Size DIN A

**3**

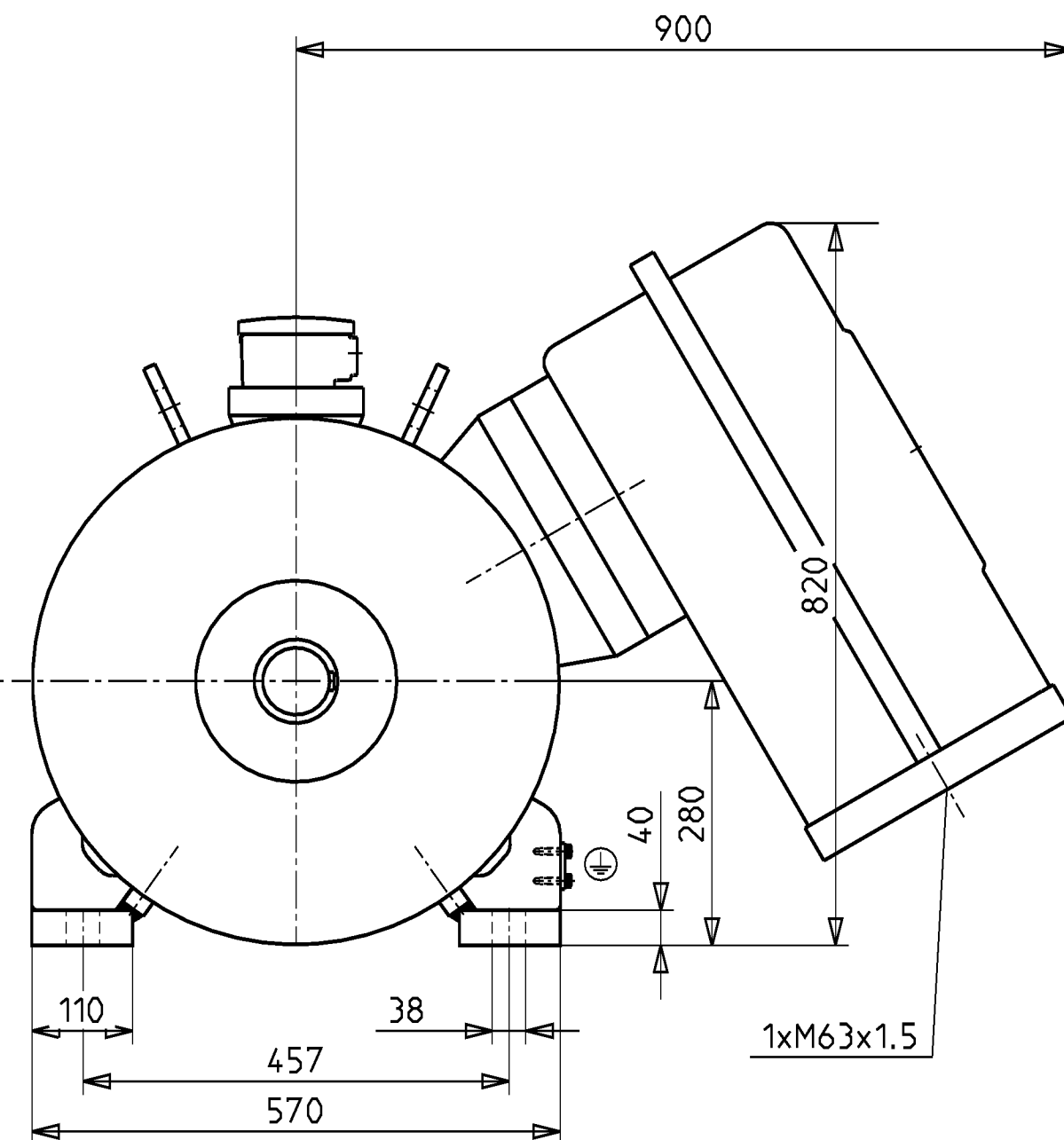
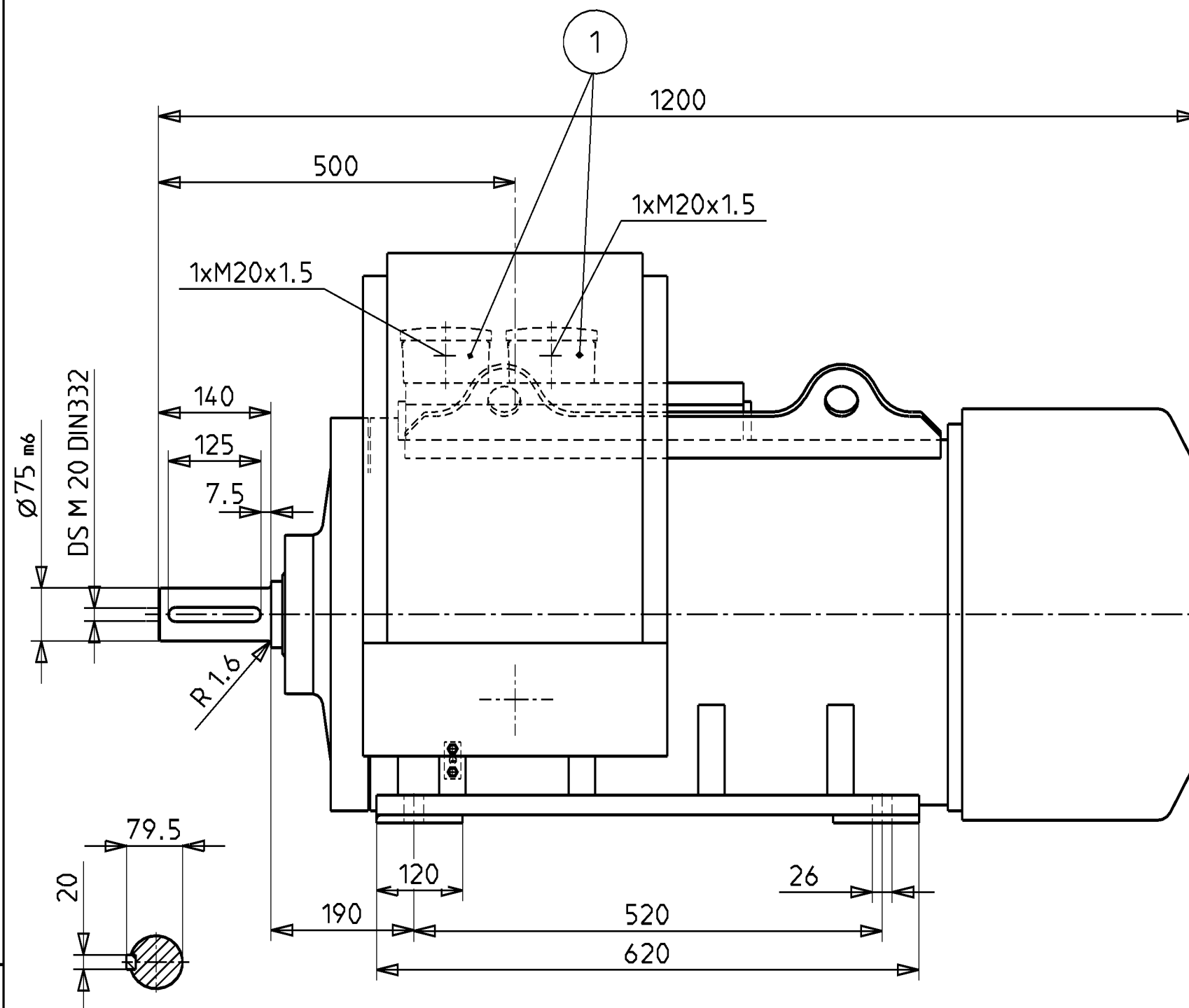


Paßfeder DIN 6885  
Key to DIN 6885

1 wahlweise Anschlußkasten für  
thermische Überwachung und Stillstandsheizung  
optionally terminal box for  
thermal monitoring and space heater

WE-Abmaße 125, 7.5, R1.6 hinzu
Änderungs-Bemerkung
Description of change
a
Änd.-Index
Change index

<b>FLENDER LOHER</b>		Erstellt Compiled		Letzte Änderung Last change		Drehstrommotor Three-phase-motor Typ/type: DJS.-280L.-02 Bauform/mounting: IM B3				Zeichnung-Nr. Drawing No. <b>MLD28-1001</b>		Blatt Sheet	Sprache Language  de/en
<i>Änderungen nur im CAD-E vornehmen.</i>		Datum Date	Name Name	Datum Date	Name Name					Letzter Änd.-Index Last change index	Format DIN A Size DIN A		
<i>Diese technische Unterlage hat gesetzlichen Schutz (DIN34).</i>  <i>This technical document is proprietary (DIN34).</i>	Bearbeitet, Designed	17.10.02	IMT27SU	04.12.03	IMT25JA	Plotdatum Print date	Plotersteller Printed by	für Abteilung for Department	Plotstatus Print status	a	3		
	Geprüft, Checked	17.10.02	IMT2 HK										
	Teileklasse Classification	20501	Bezeichnung Drawing title										
			Maßblatt Dimension sheet										

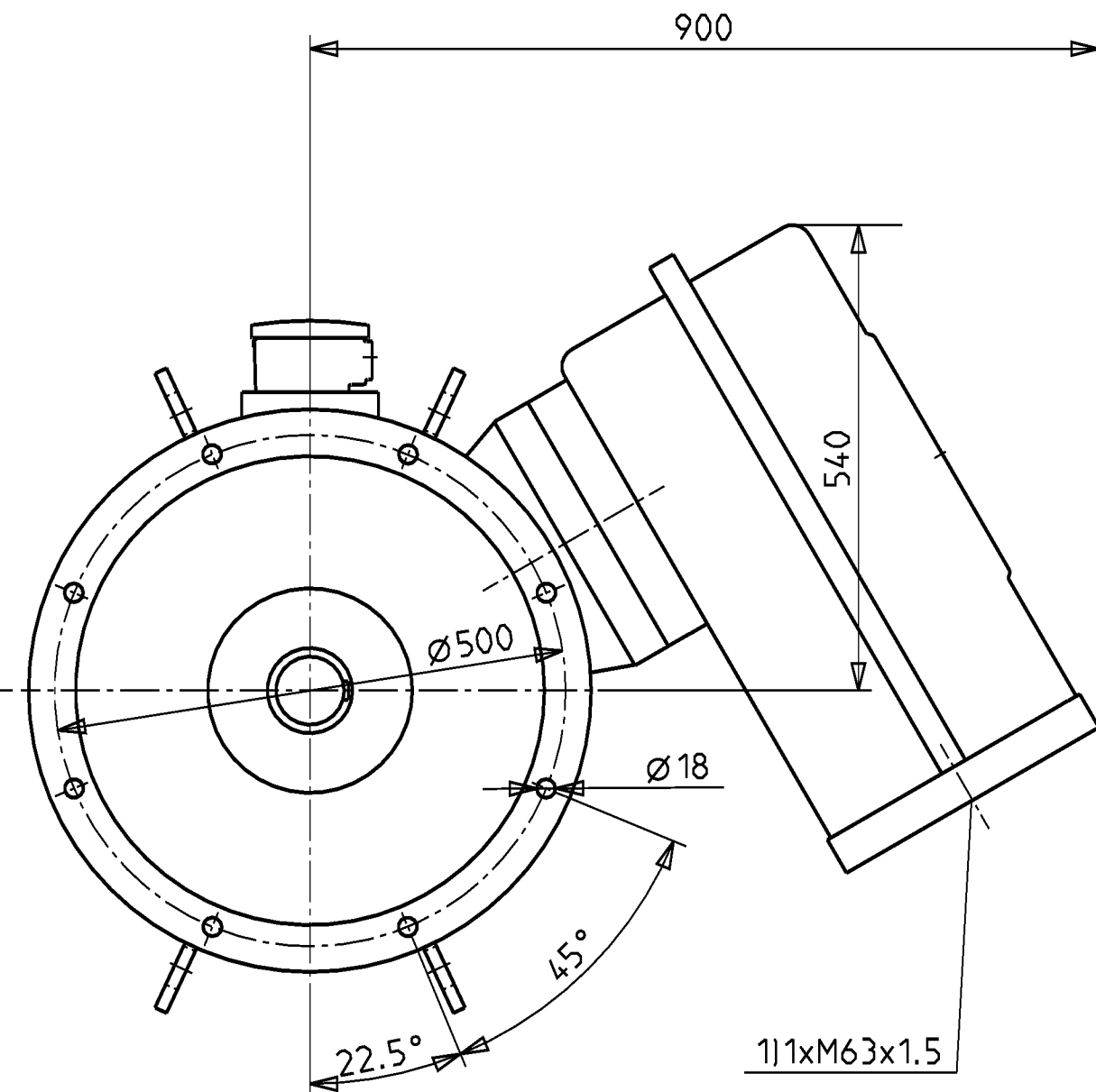
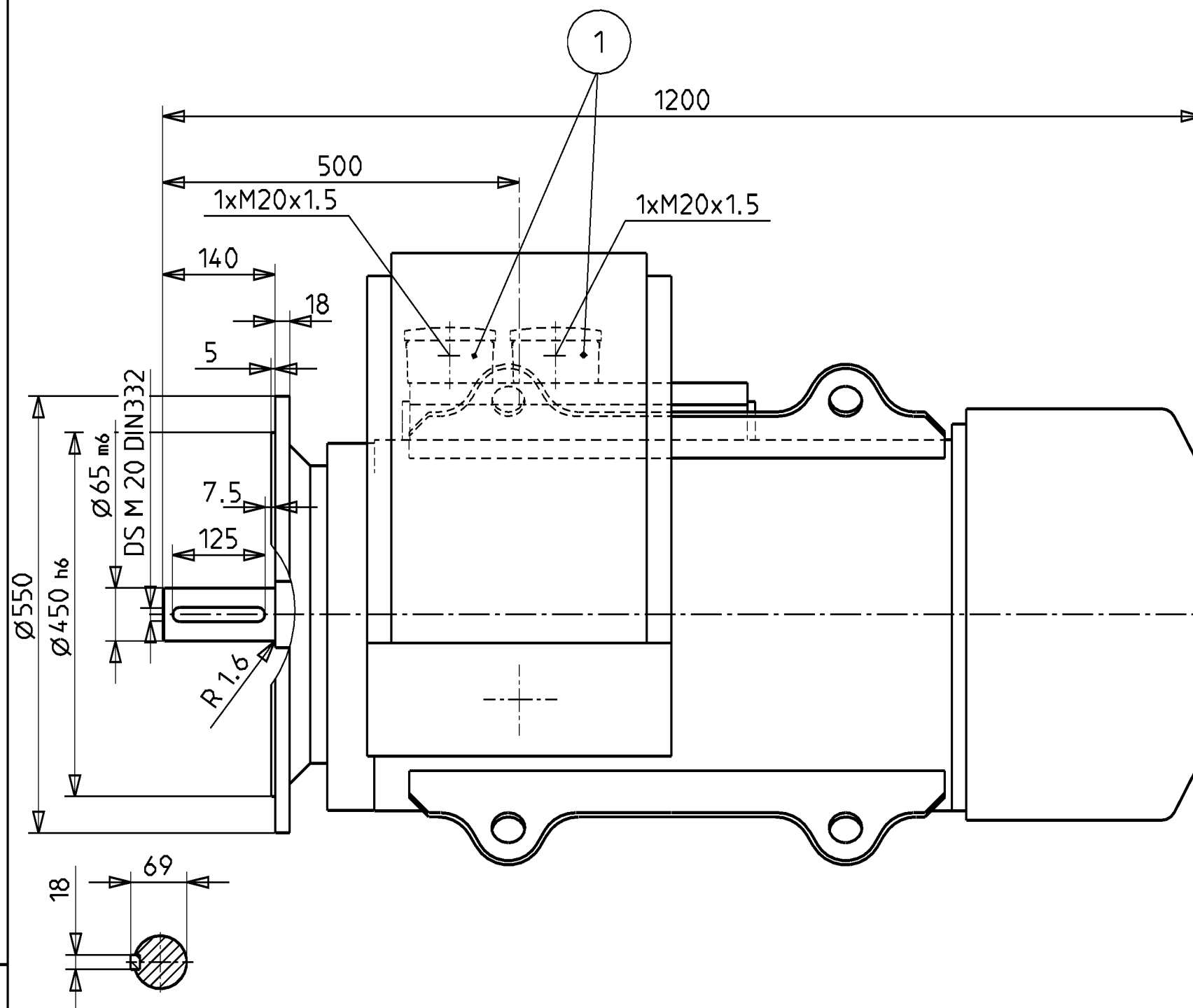


Paßfeder DIN 6885  
Key to DIN 6885

1 wahlweise Anschlußkasten für  
thermische Überwachung und Stillstandsheizung  
optionally terminal box for  
thermal monitoring and space heater

WE-Abmaße 125, 7.5, R1.6 hinzu	Änderungs-Bemerkung Description of change
a	Änd.-Index Change index

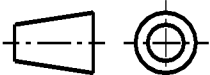
<b>FLENDER LOHER</b> <small>Änderungen nur im CAD-E vornehmen.</small>		Erstellt Compiled		Letzte Änderung Last change		Drehstrommotor Three-phase-motor Typ/type: DJS.-280L.-04 Bauform/mounting: IM B3			Zeichnung-Nr. Drawing No. <b>MLD28-1002</b>	Blatt Sheet	Sprache Language de/en
		Datum Date	Name Name	Datum Date	Name Name						
Diese technische Unterlage hat gesetzlichen Schutz (DIN34).  This technical document is proprietary (DIN34).	Bearbeitet, Designed	18.10.02	IMT27SU	04.12.03	IMT25JA	Plotdatum Print date	Plotersteller Printed by	für Abteilung for Department	Plotstatus Print status	Letzter Änd.-Index Last change index <b>a</b>	Format DIN A Size DIN A <b>3</b>
	Geprüft, Checked	18.02.02	IMT2 HK								
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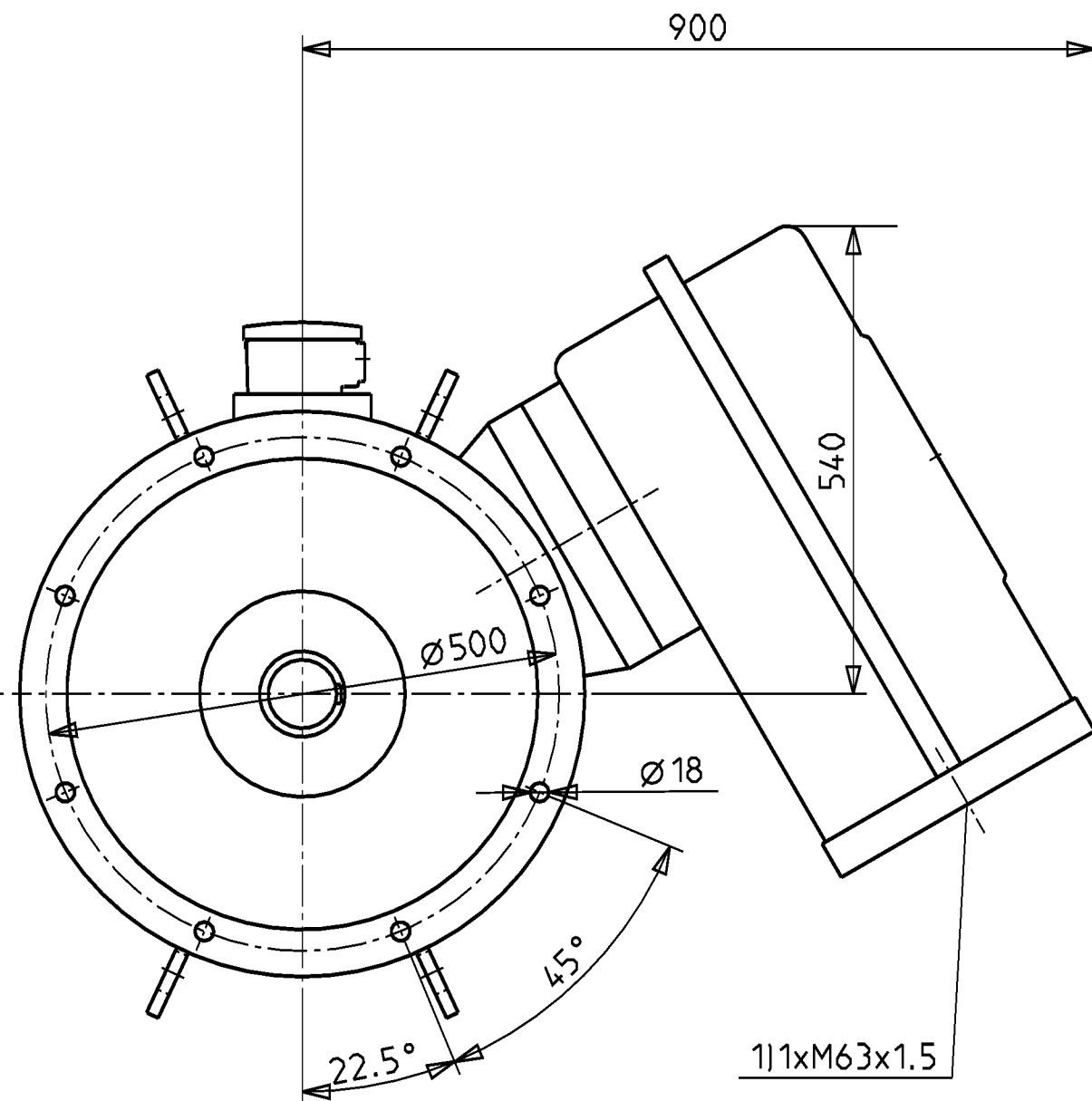
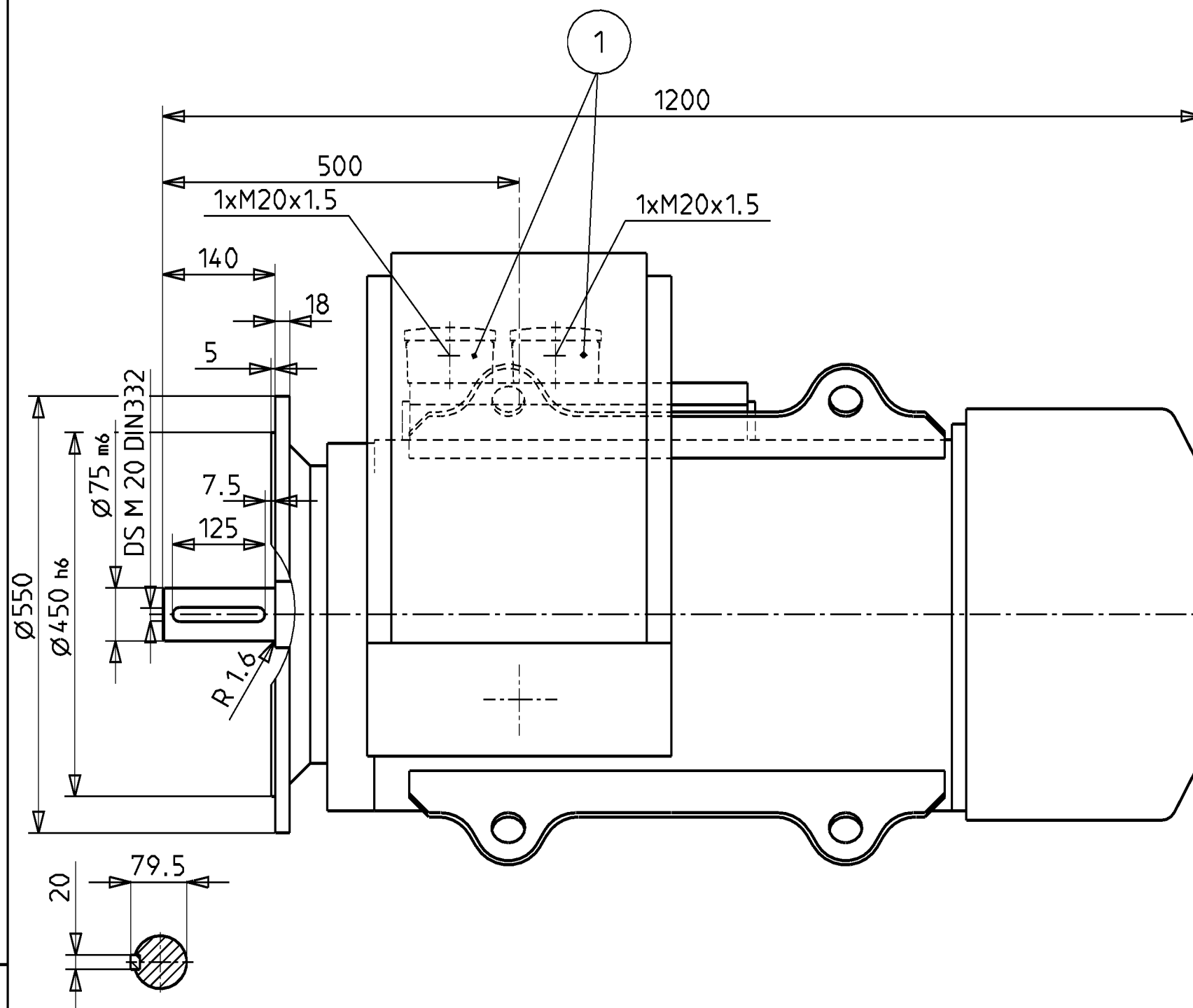
Paßfeder DIN 6885  
Key to DIN 6885

1 wahlweise Anschlußkasten für  
thermische Überwachung und Stillstandsheizung  
optionally terminal box for  
thermal monitoring and space heater

1) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

Änderungs-Bemerkung Description of change		Paßfeder DIN 6885 Key to DIN 6885										1 wahlweise Anschlußkasten für thermische Überwachung und Stillstandsheizung optionally terminal box for thermal monitoring and space heater		1) Abweichende Gewindegrößen nach Kunden-Auftrag Other thread sizes acc. customer order											
		FLENDER LOHER				Erstellt Compiled		Letzte Änderung Last change		Drehstrommotor Three-phase-motor Typ/type: DJS.-280L.-02 Bauform/mounting: IM V1, IM B5				Zeichnung-Nr. Drawing No. MLD28-1004		Blatt Sheet	Sprache Language de/en								
		Änderungen nur im CAD-E vornehmen.				Datum Date	Name Name	Datum Date	Name Name																
Änd.-Index Change index		Diese technische Unterlage hat gesetzlichen Schutz (DIN34).  This technical document is proprietary (DIN34).		Bearbeitet, Designed		15.05.03		IMT28BA						Plotdatum Print date		Plotersteller Printed by		für Abteilung for Department		Plotstatus Print status		Letzter Änd.-Index Last change index		Format DIN A Size DIN A  3	
		Geprüft, Checked		15.05.03																					
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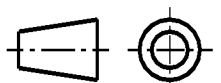


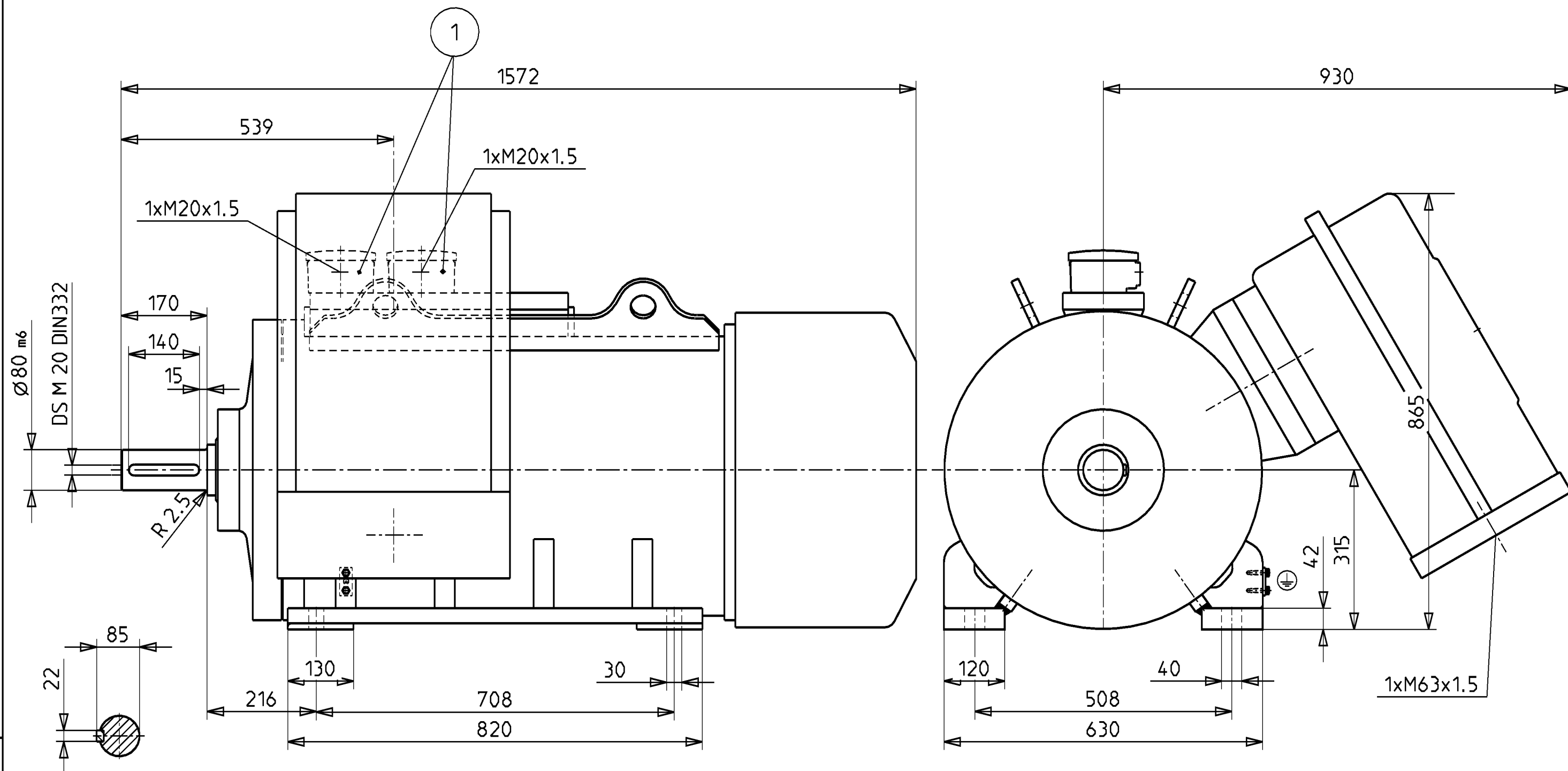


Paßfeder DIN 6885  
Key to DIN 6885

1 wahlweise Anschlußkasten für  
thermische Überwachung und Stillstandsheizung  
optionally terminal box for  
thermal monitoring and space heater

1) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

		Änderungs-Bemerkung Description of change	<div></div> <div>Paßfeder DIN 6885 Key to DIN 6885</div> <div><div>1</div><div>wahlweise Anschlußkasten für thermische Überwachung und Stillstandsheizung optionally terminal box for thermal monitoring and space heater</div></div> <div>1) Abweichende Gewindegrößen nach Kunden-Auftrag Other thread sizes acc. customer order</div>																									
			<div>FLENDER LOHER</div> <div>Änderungen nur im CAD-E vornehmen.</div>		<div></div>		<div>Erstellt Compiled</div> <div>Datum Date</div> <div>Name Name</div>		<div>Letzte Änderung Last change</div> <div>Datum Date</div> <div>Name Name</div>		<div>Drehstrommotor Three-phase-motor Typ/type: DJS.-280L.-04 Bauform/mounting: IM V1, IM B5</div>				<div>Zeichnung-Nr. Drawing No.</div> <div>MLD28-1005</div>		<div>Blatt Sheet</div>		<div>Sprache Language</div> <div>de/en</div>									
			<div>Diese technische Unterlage hat gesetzlichen Schutz (DIN34).</div> <div>This technical document is proprietary (DIN34).</div>		<div>Bearbeitet, Designed</div> <div>Geprüft, Checked</div>		<div>19.05.03</div> <div>19.05.03</div>		<div>IMT28BA</div>						<div>Plotdatum Print date</div>				<div>Plotersteller Printed by</div>		<div>für Abteilung for Department</div>		<div>Plotstatus Print status</div>		<div>Letzter Änd.-Index Last change index</div>		<div>Format DIN A Size DIN A</div>	
					<div>Teileklasse Classification</div> <div>20501</div>		<div>Bezeichnung Drawing title</div> <div>Maßblatt Dimension sheet</div>																<div>3</div>					
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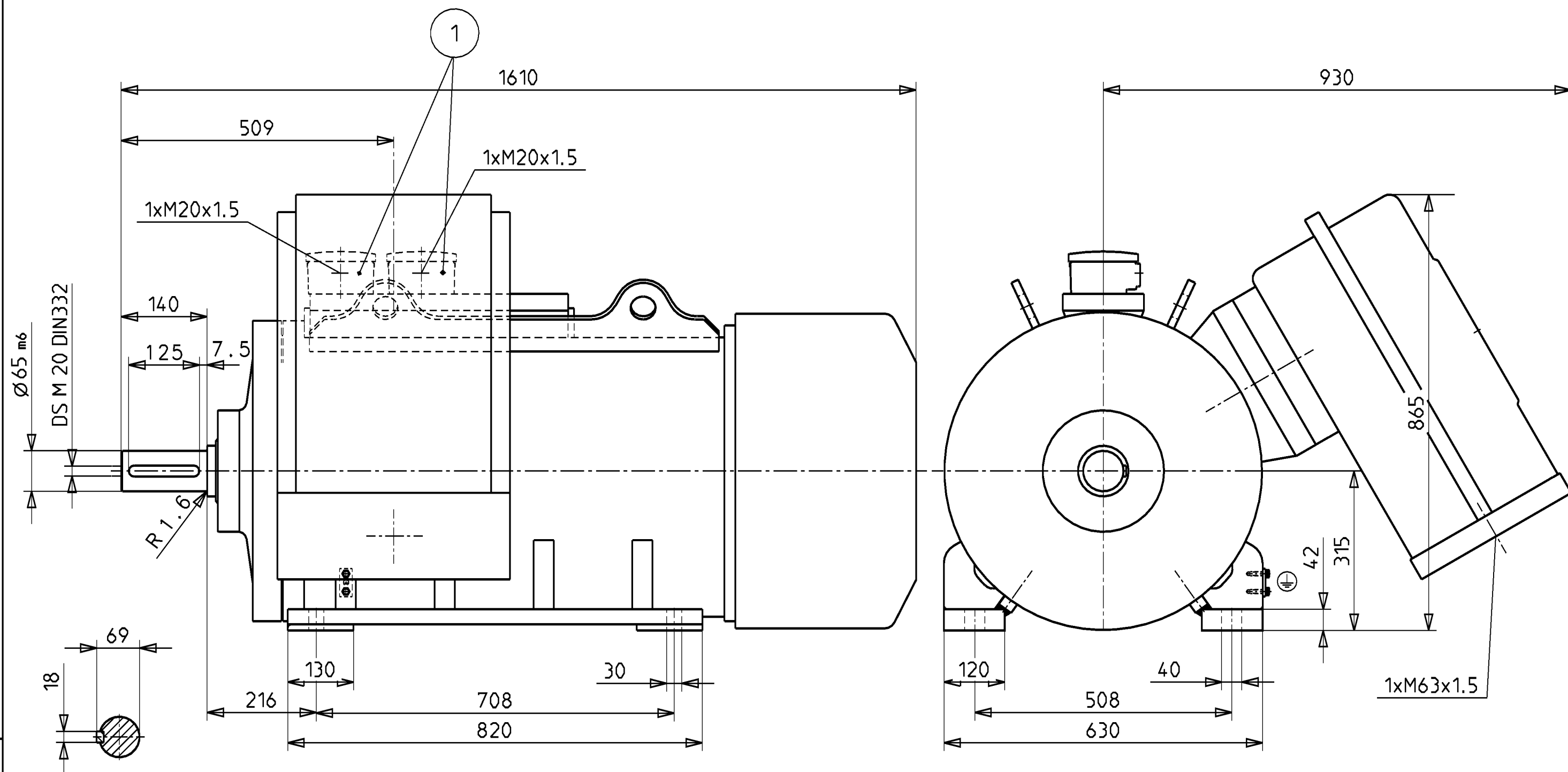


Paßfeder DIN 6885  
Key to DIN 6885

1 wahlweise Anschlußkasten für  
thermische Überwachung und Stillstandsheizung  
optionally terminal box for  
thermal monitoring and space heater

WE-Abmaße 125, 7.5, R2.5 hinzu
Änderungs-Bemerkung
Description of change
Änd.-Index
Change index
a

<b>FLENDER LOHER</b> Änderungen nur im CAD-E vornehmen.		Erstellt Compiled		Letzte Änderung Last change		Drehstrommotor Three-phase-motor Typ/type: DJS.-315L.-04 Bauform/mounting: IM B3				Zeichnung-Nr. Drawing No. <b>MLD31-1003</b>	Blatt Sheet	Sprache Language de/en
		Datum Date	Name Name	Datum Date	Name Name							
Diese technische Unterlage hat gesetzlichen Schutz (DIN34).  This technical document is proprietary (DIN34).	Bearbeitet, Designed	17.10.02	IMT27SU	04.12.03	IMT25JA	Plotdatum Print date	Plotersteller Printed by	für Abteilung for Department	Plotstatus Print status	Letzter Änd.-Index Last change index <b>a</b>	Format DIN A Size DIN A <b>3</b>	
	Geprüft, Checked	17.10.02	IMT2 HK									
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Paßfeder DIN 6885  
Key to DIN 6885

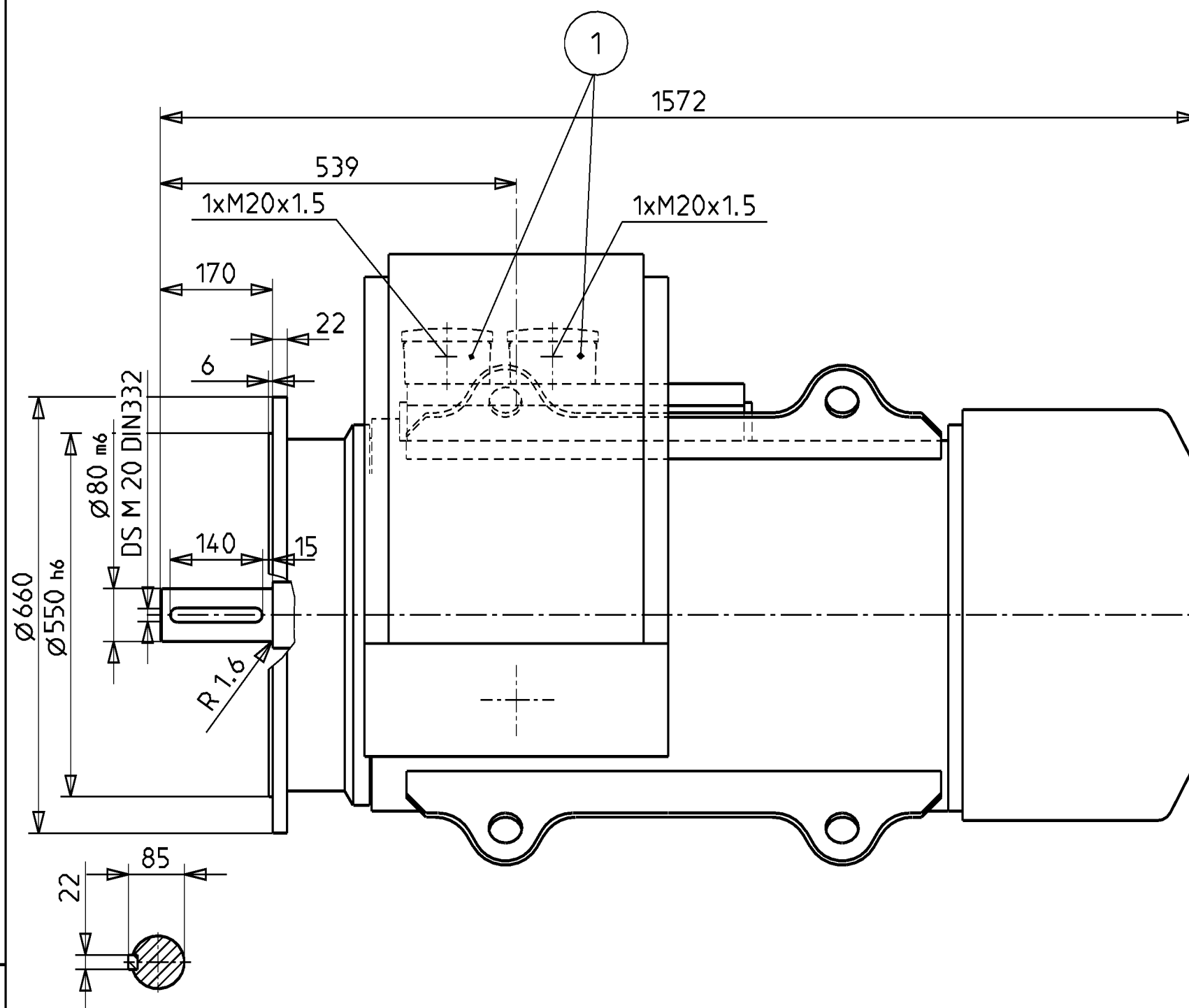
Geräuschgüte 3  
Noise class 3

① wahlweise Anschlußkasten für  
thermische Überwachung und Stillstandsheizung  
optionally terminal box for  
thermal monitoring and space heater

Passfederbemessung dazu Änderungs-Bemerkung Description of change	
Änd.-Index Change index	a

<b>FLENDER LOHER</b> <small>Änderungen nur im CAD-E vornehmen.</small>		Erstellt Compiled		Letzte Änderung Last change		Drehstrommotor Three-phase-motor Typ/type: DJS.-315L.-02 Bauform/mounting: IM B3				Zeichnung-Nr. Drawing No. <b>MLD31-1004</b>	Blatt Sheet	Sprache Language de/en
		Datum Date	Name Name	Datum Date	Name Name							
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	Geprüft, Checked	17.10.02	IMT2 HK									
	Teileklasse Classification <b>20501</b>	Bezeichnung Drawing title <b>Maßblatt Dimension sheet</b>										


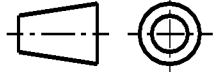




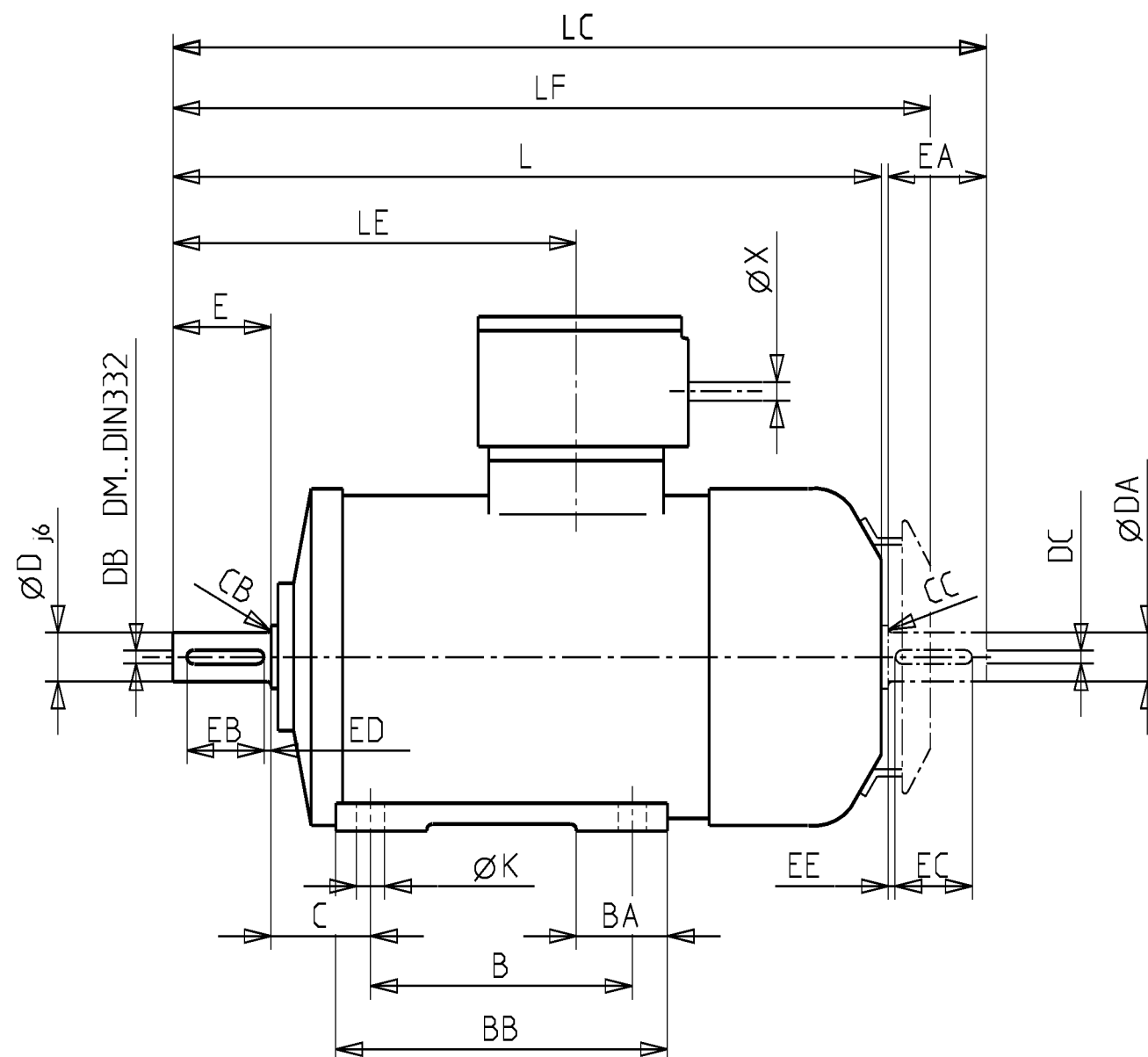
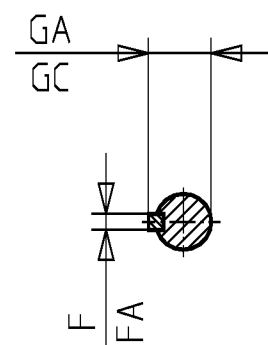
Paßfeder DIN 6885  
Key to DIN 6885

1 wahlweise Anschlußkasten für  
thermische Überwachung und Stillstandsheizung  
optionally terminal box for  
thermal monitoring and space heater

1) Abweichende Gewindegrößen nach Kunden-Auftrag  
Other thread sizes acc. customer order

		Änderungs-Bemerkung Description of change	<div></div> <div>Paßfeder DIN 6885 Key to DIN 6885</div> <div><div>1</div><div>wahlweise Anschlußkasten für thermische Überwachung und Stillstandsheizung optionally terminal box for thermal monitoring and space heater</div></div> <div>1) Abweichende Gewindegrößen nach Kunden-Auftrag Other thread sizes acc. customer order</div>																			
			<div><div>FLENDER LOHER</div><div>Änderungen nur im CAD-E vornehmen.</div></div>		<div></div>		<div>Erstellt Compiled</div> <div>Datum Date</div> <div>Name Name</div>		<div>Letzte Änderung Last change</div> <div>Datum Date</div> <div>Name Name</div>		<div>Drehstrommotor Three-phase-motor Typ/type: DJS.-315L.-04 Bauform/mounting: IM V1, IM B5</div>				<div>Zeichnung-Nr. Drawing No.</div> <div>MLD31-1006</div>		<div>Blatt Sheet</div>		<div>Sprache Language</div> <div>de-en</div>			
			<div>Diese technische Unterlage hat gesetzlichen Schutz (DIN34).</div> <div>This technical document is proprietary (DIN34).</div>		<div>Bearbeitet, Designed 19.05.03 IMT28BA</div> <div>Geprüft, Checked 19.05.03 IMT2</div>						<div>Plotdatum Print date</div>		<div>Plottersteller Printed by</div>		<div>für Abteilung for Department</div>		<div>Plotstatus Print status</div>		<div>Letzter Änd.-Index Last change index</div>		<div>Format DIN A Size DIN A</div> <div>3</div>	
			<div>Änd.-Index Change index</div>		<div>Teileklasse Classification</div> <div>20501</div>		<div>Bezeichnung Drawing title</div> <div>Maßblatt Dimension sheet</div>															
1		2		3		4		5		6		7		8								

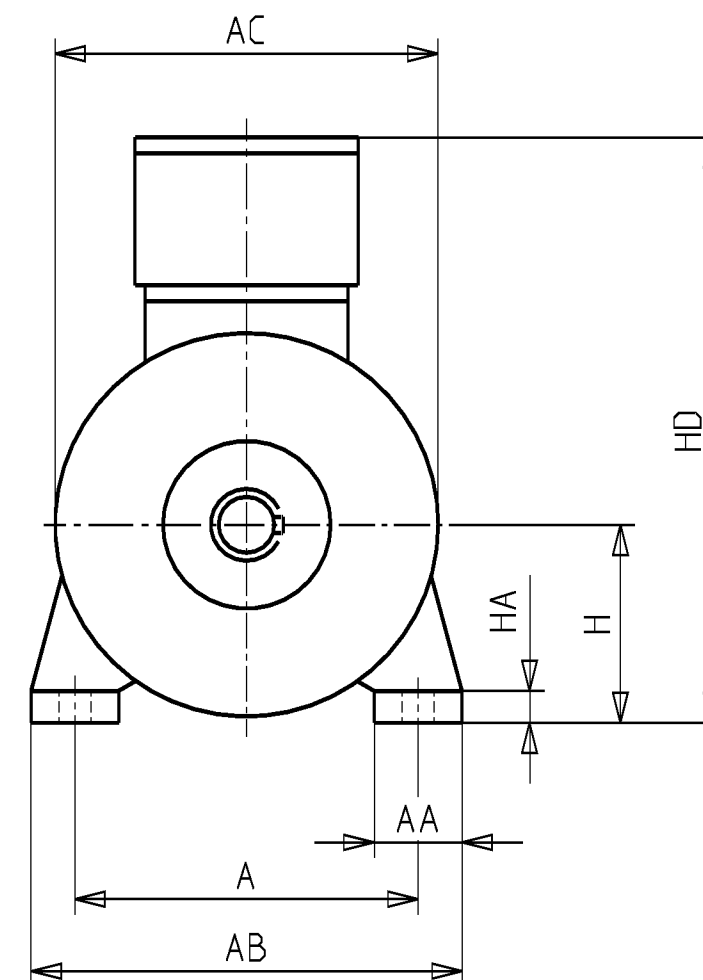
			WE-Passung k6 in j6 geä. Maß EB, ED, CB nachgeir.	Änderungs-Bemerkung Description of change
		d	Änd.-Index Change index	
Text-Abweichende Gewindegrößen ... hinzu				
Klemmenkasten ab BG080 drehbar				
AK.Einf.Gew.geä.				
Änd.-Index				
Change index				

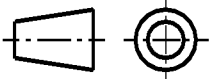


Paßfeder DIN 6885  
Klemmenkasten ist ab Baugröße 080 um je 90° drehbar  
Wahlweise Klemmenkasten EExdIIC  
Für thermische Überwachung Einführung M20x1.5

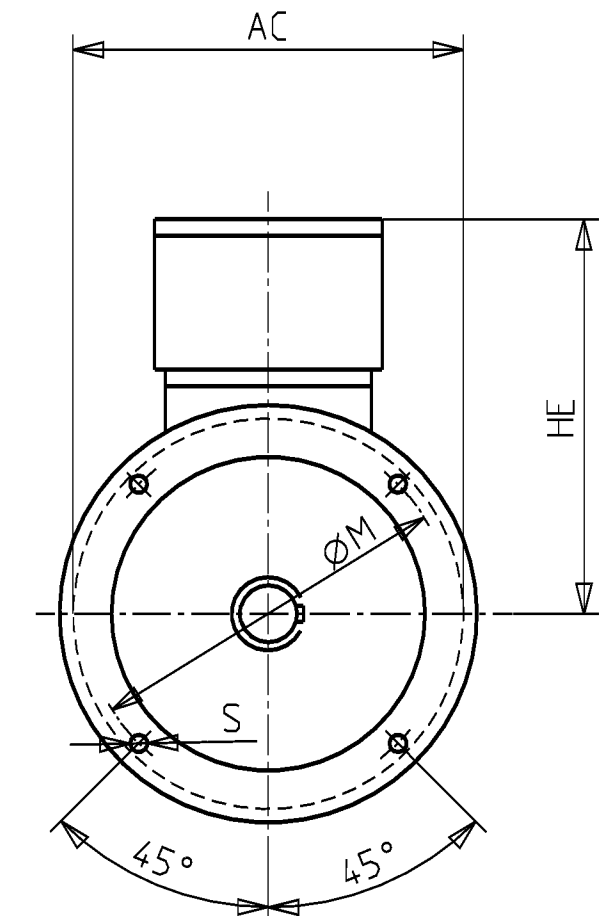
Key to DIN 6885  
From frame size 080 terminal box  
can be turned 90° in each direction  
Alternatively terminal box EExdIIC  
Cable inlet M20x1.5 for thermal monitoring

1) Abweichende Gewindegrößen nach Kunden-Auftrag  
other thread sizes acc. customer order



Baugröße frame size	Polzahl number of poles	A	AA	AB	AC	B	BA	BB	C	D DA	DB DC	E EA	EB EC	ED EE	CB CC	F FA	GA GC	H	HA	HD	K	L	LC	LE	LF	X <sup>1)</sup>													
071	2-8	112	30	140	139	90	30	114	45	14	M5	30	22	4	0.6	5	16	71	10	218	9	271	307	114	292	1xM20x1.5													
080	2-8	125	32	160	157	100	35	130	50	19	M6	40	32	4	0.4	6	21.5	80	10	249	11	317	362	131	340	1xM25x1.5													
090	2-8	140	35	180	177	125	40	155	56	24	M8	50	40	5	0.4	8	27	90	10	271	12	360	415	140	390	1xM25x1.5													
100	2-8	160	45	205	195	140	45	175	63	28	M10	60	50	5	0.4	8	31	100	17	297	12	416	481	158	451	1xM32x1.5													
112	2-8	190	50	235	219	140	50	180	70	28	M10	60	50	5	0.6	8	31	112	15	311	12	438	504	159	473	2xM32x1.5													
<div>FLENDER LOHER</div> <div>Änderungen nur im CAD-E vornehmen.</div>				Erstellt Compiled		Letzte Änderung Last change		Drehstrommotoren mit Käfigläufer Three-phase motors with squirrel cage-rotor Typ/type: DNG. Bauform/mounting: IM B3, IM V5, IM V6 DIN 42673																		Zeichnung-Nr. Drawing No.  MVD00-0001		Blatt Sheet		Sprache Language  de/en									
				Datum Date		Name Name																										Datum Date		Name Name					
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		Geprüft, Checked		20.12.01		IMT2HK																																	
		Teileklasse Classification		20501		Bezeichnung Drawing title		Maßblatt Dimension sheet																															

1) Abweichende Gewindegrößen nach Kunden-Auftrag  
other thread sizes acc. customer order



	Zeichnung-Nr. Drawing No. <b>MVD00-0002</b>	Blatt Sheet	Sprache Language de/en
		Letzter Änd.-Index Last change index d	Format DIN A Size DIN A 3

Blatt Sheet	Sprache Language  de/en
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<i>Plotdatum</i> <i>Print date</i>	<i>Plotersteller</i> <i>Printed by</i>	<i>für Abteilung</i> <i>for Department</i>	<i>Plotstatus</i> <i>Print status</i>
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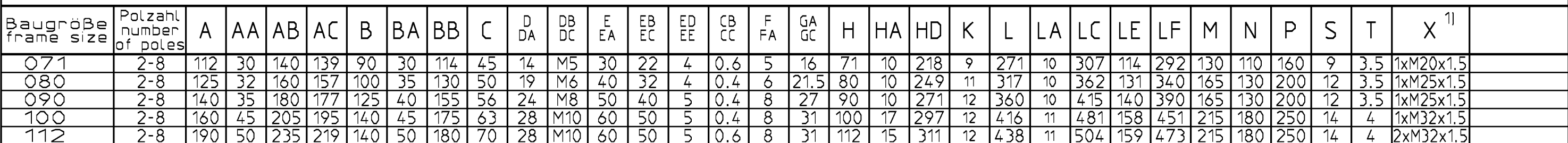
1	2	3	4	5	6	7	8
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A

B

C

D



Letzte Änderung  
Last change

*Sprache*  
*Language*

Name  
Name

Format DIN A  
Size DIN A

Bezeichnung	Maßblatt
Drawing title	Dimension sheet

3



A

B

C

D

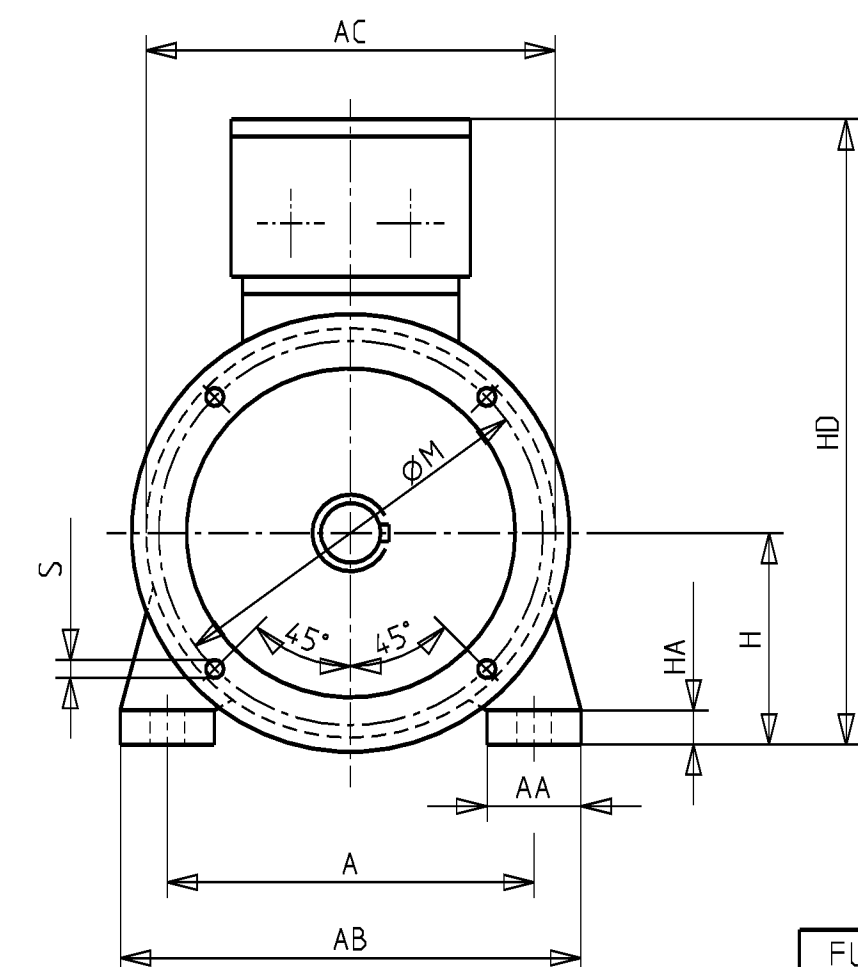
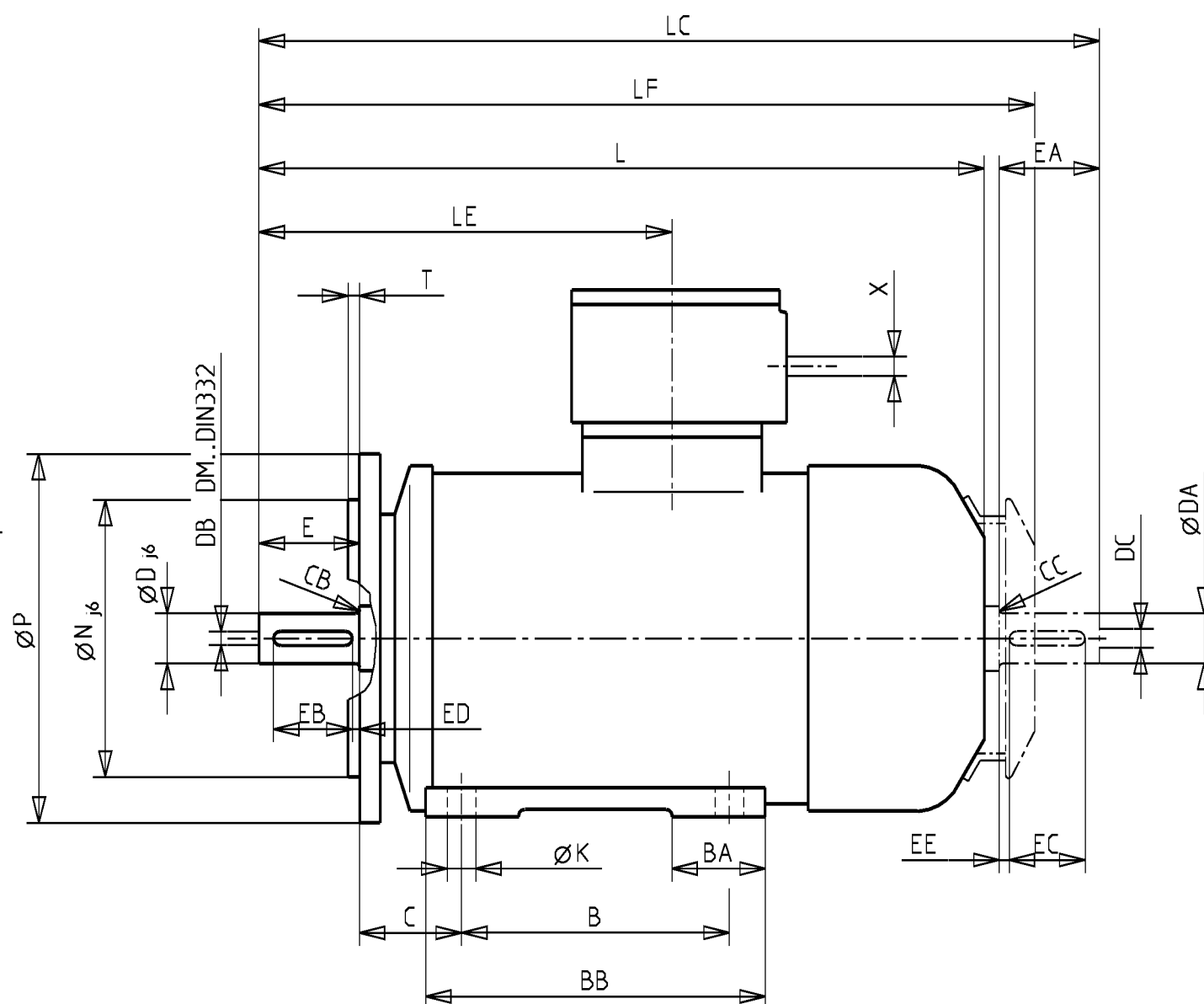
EF

Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
Paßfeder DIN 6885  
Klemmenkasten ist ab Baugröße 080 um je 90° drehbar  
Wahlweise Klemmenkasten EExdIIC  
Für thermische Überwachung Einführung M20x1.5

Flange-position: The joining-side of the flange is position in a stright line with the shaft shoulder

Key to DIN 6885  
From frame size 080 terminal box can be turned 90° in each direction  
Alternatively terminal box EExdIIC  
Cable inlet M20x1.5 for thermal monitoring

1) Abweichende Gewindegrößen nach Kunden-Auftrag  
other thread sizes acc. customer order



Flansch wahlweise  
Flange optionally

Baugr. frame size	Polzahl number of poles	A	AA	AB	AC	B	BA	BB	C	D DA	DB DC	E EA	EB EC	ED EE	CB CC	F FA	GA GC	H	HA	HD	K	L	LC	LE	LF	M	N	P	S	T	X <sup>1)</sup>	M	N	P	S	T
071	2-8	112	30	140	139	90	30	114	45	14	M5	30	22	4	0.6	5	16	71	10	218	9	271	307	114	292	85	70	105	M6	2.5	1xM20x1.5	115	95	140	M8	3
080	2-8	125	32	160	157	100	35	130	50	19	M6	40	32	4	0.4	6	21.5	80	10	249	11	317	362	131	340	100	80	120	M6	3	1xM25x1.5	130	110	160	M8	3.5
090	2-8	140	35	180	177	125	40	155	56	24	M8	50	40	5	0.4	8	27	90	10	271	12	360	415	140	390	115	95	140	M6	3	1xM25x1.5	130	110	160	M8	3.5
100	2-8	160	45	205	195	140	45	175	63	28	M10	60	50	5	0.4	8	31	100	17	297	12	416	481	158	451	130	110	160	M6	3.5	1xM32x1.5	165	130	200	M10	3.5
112	2-8	190	50	235	219	140	50	180	70	28	M10	60	50	5	0.6	8	31	112	15	311	12	438	504	159	473	130	110	160	M6	3.5	2xM32x1.5	165	130	200	M10	3.5

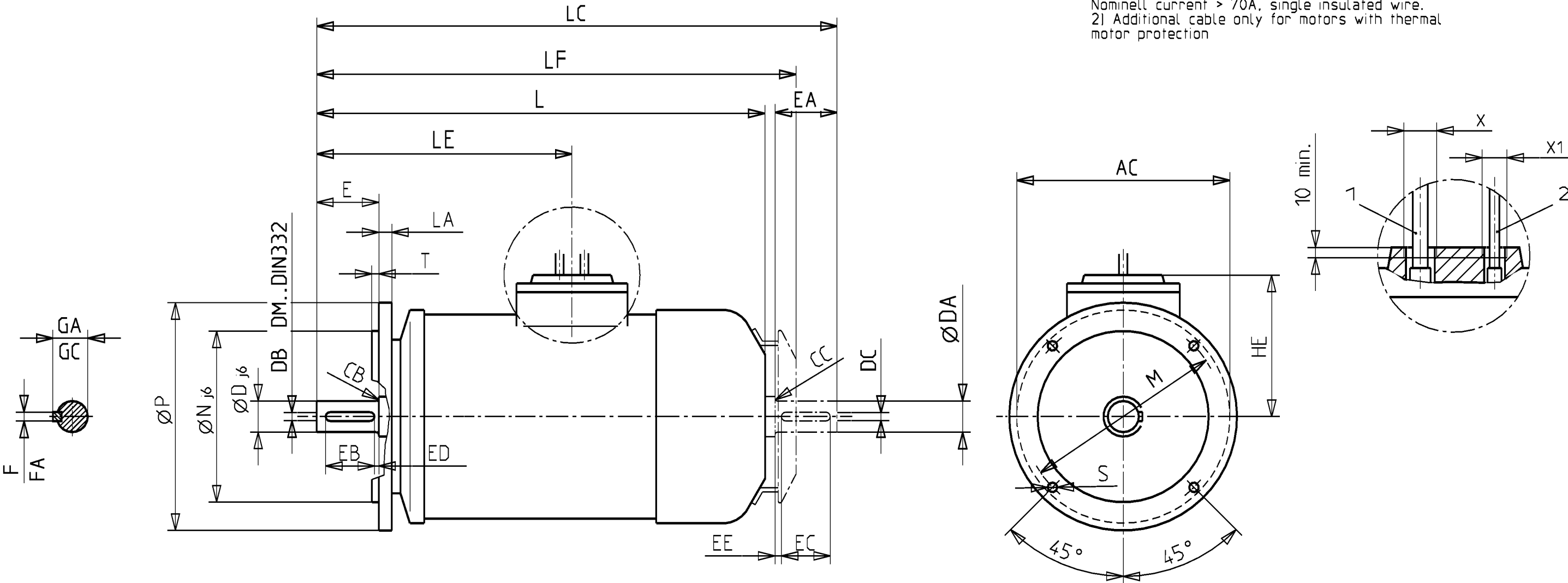
<b>FLENDER LOHER</b>				Erstellt Compiled		Letzte Änderung Last change		Drehstrommotoren mit Käfigläufer Three-phase motors with squirrel cage-rotor Typ/type: DNG. Bauform/mounting: IM B34, IM V5/IM V18, IM V6/IM V19										Zeichnung-Nr. Drawing No.		Blatt Sheet		Sprache Language	
Änderungen nur im CAD-E vornehmen.				Datum Date	Name Name	Datum Date	Name Name											MVD00-0005				de/en	
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		Teileklasse Classification		20501		Bezeichnung Drawing title		Maßblatt Dimension sheet												Letzter Änd.-Index Last change index		Format DIN A Size DIN A	
																				d		3	



Flanschlage: Die Anschraubfläche des Flansches liegt mit der Kante der Wellenschulter in einer Ebene  
Paßfeder DIN 6885

- 1) Kabel NSSHöu, freie Länge nach Bedarf.  
Nennstrom > 70A, Einzeladern  
2) Zusatzkabel nur bei Motoren mit thermischer Überwachung

Flange-position: The joining-side of the flange is position in a straight line with the shaft shoulder  
Key to DIN 6885

- 1) Cable NSSHöu, free Lengt acc. to your demand.  
Nominell current > 70A, single insulated wire.  
2) Additional cable only for motors with thermal motor protection



Baugröße frame size	Polzahl number of poles	AC	D DA	DB DC	E EA	EB EC	ED EE	CB CC	F FA	GA GC	HE	L	LA	LC	LE	LF	M	N	P	S	T	X	X1															
071	2-8	139	14	M5	30	22	4	0.6	5	16	120	271	10	307	114	292	130	110	160	9	3.5	PG21	PG21															
080	2-8	157	19	M6	40	32	4	0.4	6	21.5	126	317	10	362	131	340	165	130	200	12	3.5	PG21	PG21															
090	2-8	177	24	M8	50	40	5	0.4	8	27	135	360	10	415	140	390	165	130	200	12	3.5	PG21	PG21															
100	2-8	195	28	M10	60	50	5	0.4	8	31	142	416	11	481	158	451	215	180	250	14	4	PG21	PG21															
112	2-8	219	28	M10	60	50	5	0.6	8	31	154	438	11	504	159	473	215	180	250	14	4	PG21	PG21															
FLENDER LOHER				Erstellt Compiled		Letzte Änderung Last change		Drehstrommotoren mit Käfigläufer Three-phase motors with squirrel cage-rotor Typ/type: DNG. Bauform/mounting: IM B5, IM V1, IM V3 DIN 42677															Zeichnung-Nr. Drawing No.  MVD00-0007		Blatt Sheet		Sprache Language  de/en											
				Datum Date		Name Name																							Datum Date		Name Name							
Änderungen nur im CAD-E vornehmen.				Datum Date		Name Name		Datum Date		Name Name		Plotdatum Print date															Plotersteller Printed by		für Abteilung for Department		Plotstatus Print status		Letzter Änd.-Index Last change index  a		Format DIN A Size DIN A  3			
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This technical document is proprietary (DIN34).				Geprüft, Checked		26.08.02		IMT2 HK																														
		Teileklasse Classification		20501		Bezeichnung Drawing title		Maßblatt Dimension sheet																														

<b>An / To:</b> <b>Loher GmbH</b> Hans-Loher-Strasse 32, D-94099 Ruhstorf Postfach 1164, D-94095 Ruhstorf Angebots- und Auftragszentrum Vertrieb Industriemotoren / Sales Support Department – Industrial motors  Phone +49 ( 0 ) 8531-39-0, Fax +49 ( 0 ) 8531-39-584				<b style="font-size: 1.5em; color: blue;">FLENDER</b> <b style="font-size: 1.2em; color: gray;">LOHER</b>  <span style="font-size: 2em; font-family: cursive;">Checklist</span>	
<b>Von / From:</b>		Date:		Necessary data for inquiries	
<b>Phone No.:</b> <b>Fax No.:</b> <b>E-Mail:</b>					
Total requirement:		Unit(s)	Lot size(s):	Price expectations: € / Unit	
Drive for :			<input type="checkbox"/> Heavy starting <input type="checkbox"/> Inverter operation <input type="checkbox"/> relevant data		
Basic data for : <input type="checkbox"/> Standard- <input type="checkbox"/> Ex- <input type="checkbox"/> Brake- <input type="checkbox"/> Elevator- <input type="checkbox"/> Slip ring rotor-    Motor					
Data for inverter operation: <input type="checkbox"/> see text				Frequency:    Hz	
eff. power required: kW		Load torque characteristic: <input type="checkbox"/> square <input type="checkbox"/> constant <input type="checkbox"/> linear		Control range:    :	
Motor type:					
Power:    /    /    /    kW/Nm <input type="checkbox"/> P2 <input type="checkbox"/> P1 <input type="checkbox"/> M2				<input type="checkbox"/> 3-phase <input type="checkbox"/> 6-phase	
Voltage:    /    V    IEC 38 <input type="checkbox"/> yes <input type="checkbox"/> no				<input type="checkbox"/> +/-    %	
Speed:    /    /    /    min <sup>-1</sup>				Frequency: <input type="checkbox"/> 50Hz <input type="checkbox"/> 60Hz    Hz	
Dimension drawing:			Mounting IM		
Duty type: S -    c/h    fl:			Motor protection: <input type="checkbox"/> 3 PTC thermistors <input type="checkbox"/> 3 PTC thermistors as sole protection		
Load moment of inertia    J =    kgm <sup>2</sup>			<input type="checkbox"/> PT 100 <input type="checkbox"/> see text		
Referred to n =    min <sup>-1</sup> GD <sup>2</sup> = 4 x J [kpm <sup>2</sup> ]			Load torque for starting    M =    Nm:		
Rotor type:		Position terminal box: <input type="checkbox"/> rh <input type="checkbox"/> lh <input type="checkbox"/> top <input type="checkbox"/> bottom		Shaft ends: <input type="checkbox"/> 1 <input type="checkbox"/> 2    Heating:    V	
Temperature class: <input type="checkbox"/> T1 <input type="checkbox"/> T2 <input type="checkbox"/> T3 <input type="checkbox"/> T4 <input type="checkbox"/> T ...			Special condition:    /		
Protection type: <input type="checkbox"/> EExe II <input type="checkbox"/> EExd II C <input type="checkbox"/> EEx de II C <input type="checkbox"/> EEx <input type="checkbox"/> see text				Forced ventilation: <input type="checkbox"/> 3~ <input type="checkbox"/> 1~	
Insulation class: <input type="checkbox"/> F <input type="checkbox"/> H <input type="checkbox"/> C			Enclosure: IP		
Type series:			Frame size:		
Painting: <input type="checkbox"/> Standard <input type="checkbox"/> RAL <input type="checkbox"/> not painted    Other:					

